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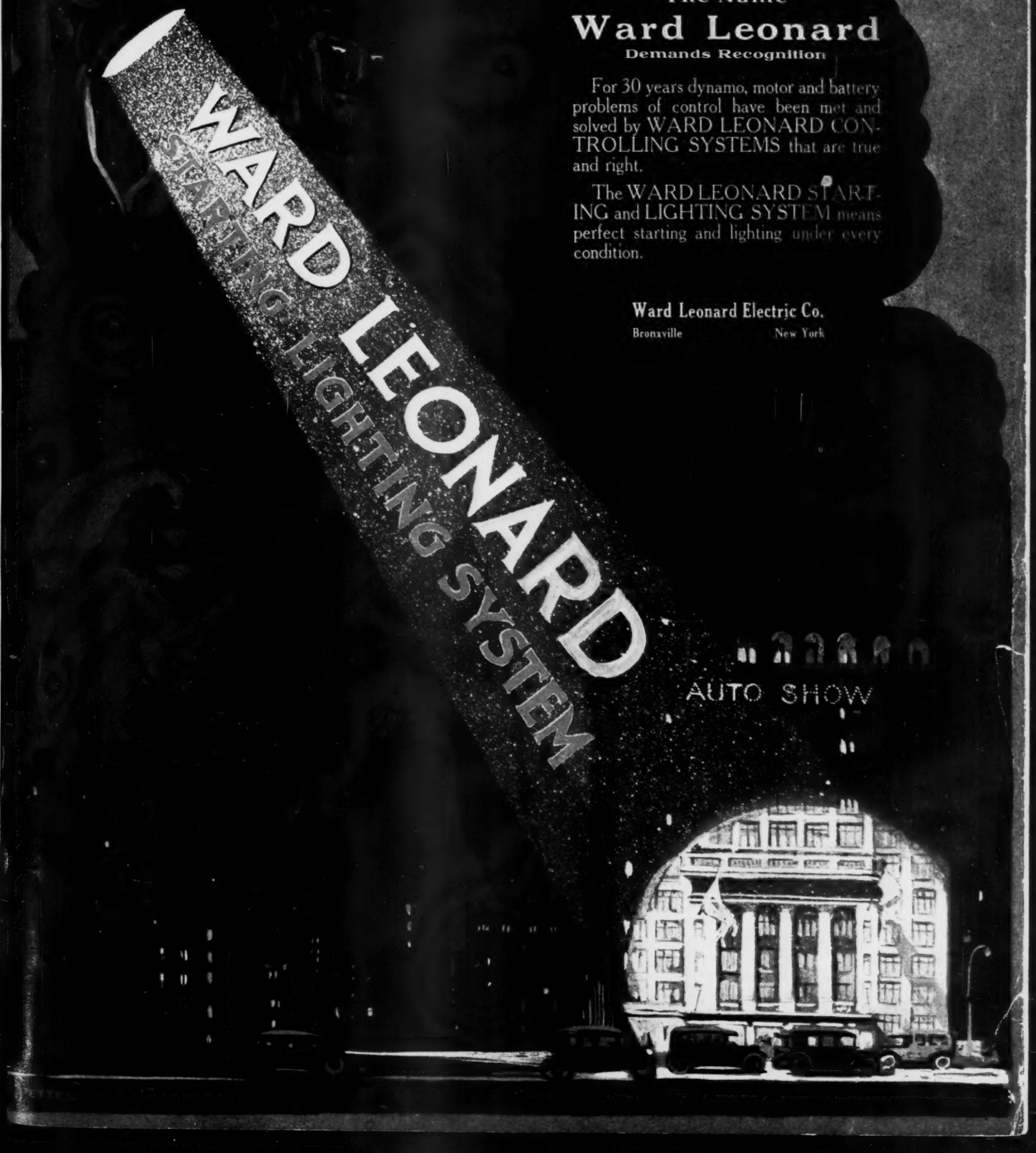

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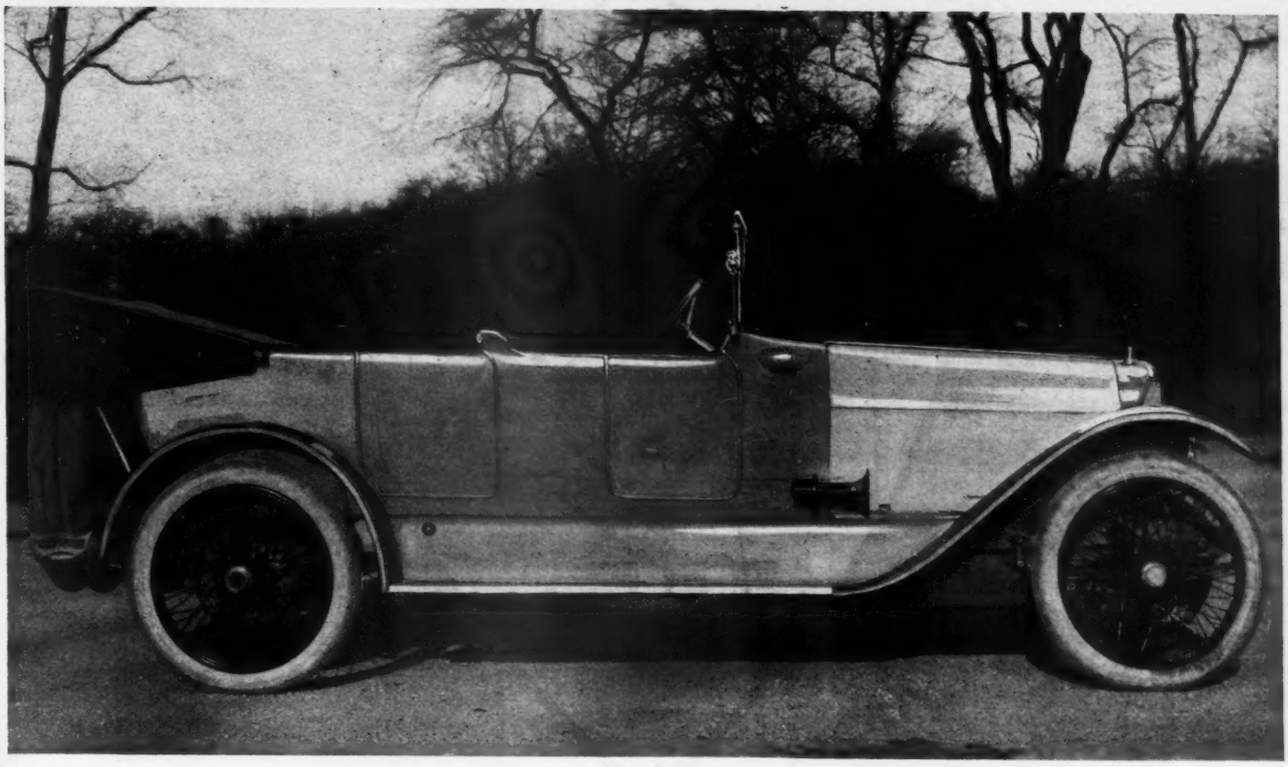

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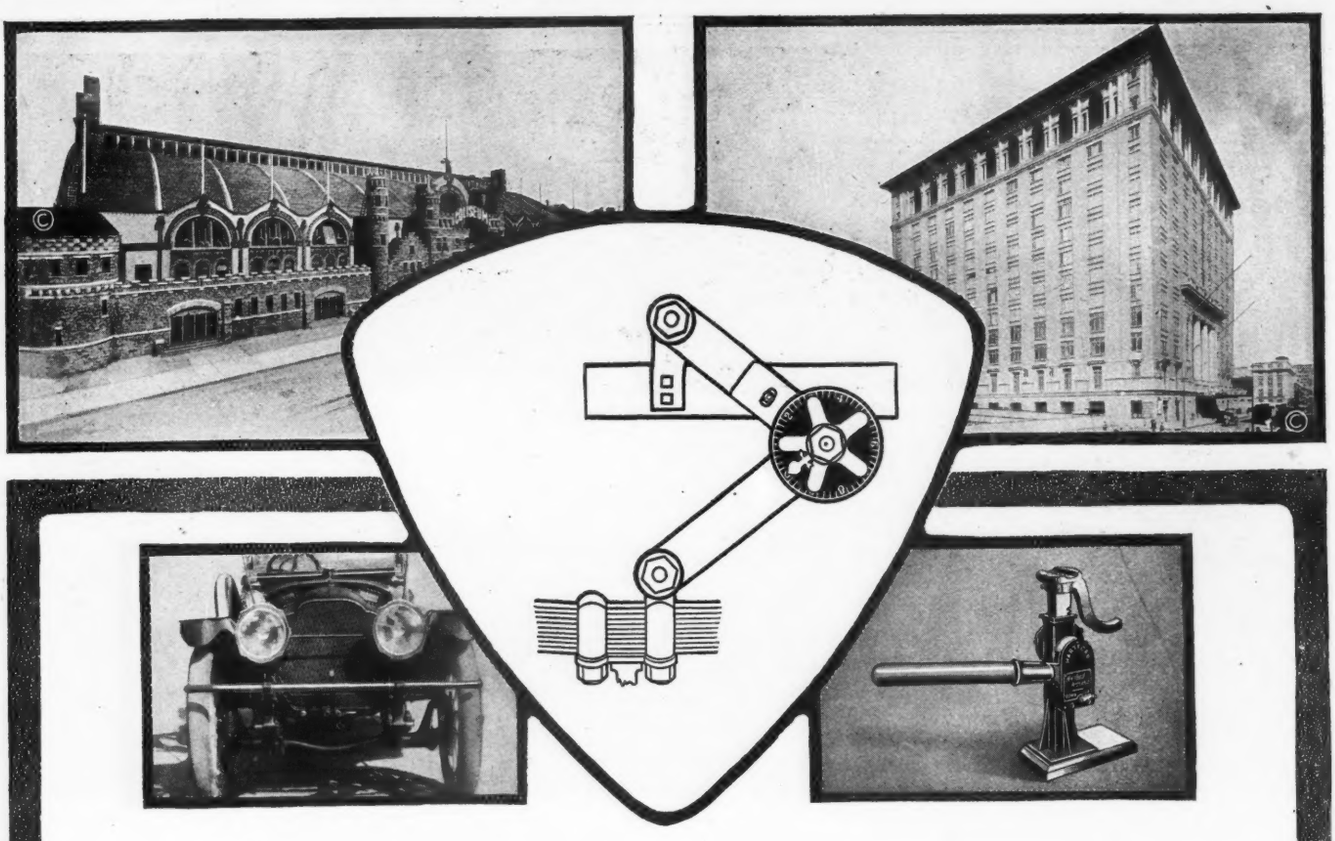

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MOTOR AGE

Tracing the Progress of the Year

What Engineers Have Done for 1914

By Darwin S. Hatch

THERE is to be a coming out party in New York Saturday evening. The American motor car of 1914, a graceful, faithful and accomplished creature, makes its debut in the most gorgeous of American salons, the Grand Central Palace. Thousands of residents of the modern Bagdad-on-the-Hudson, augmented by connoisseurs that run the alphabetical gamut from Adrian, Mich., to Zanesville, O., will assemble there to admire, inspect, covet and ultimately purchase. Titta Ruffo and his golden notes at the Metropolitan Opera House cannot be classed as a rival attraction on that night. He probably will sing to many an unoccupied seat. New York will pay homage to but one idol and that the motor car of 1914.

Father Knickerbocker is ready to act the host as in years past. His brocaded coat has been cleaned and pressed. The ruffles of his shirt have been starched afresh. His shoe buckles have been polished until he can see the reflection of his florid face in them. Father Knickerbocker is a gay old gentleman with an eye for the beautiful. After receiving his thousands of guests, he will admire the lines of the latest limousine, reflect on the speed of the sportiest of roadsters, dream of delightful migrations in the most luxurious of touring cars and sigh with satisfaction. For a whole week he will play the dual role of host and connoisseur and at the end of seven nights of a thousand cars will glow with pride as he surrenders his exhibits to Chicago and the middle west.

Concrete Examples of Progress

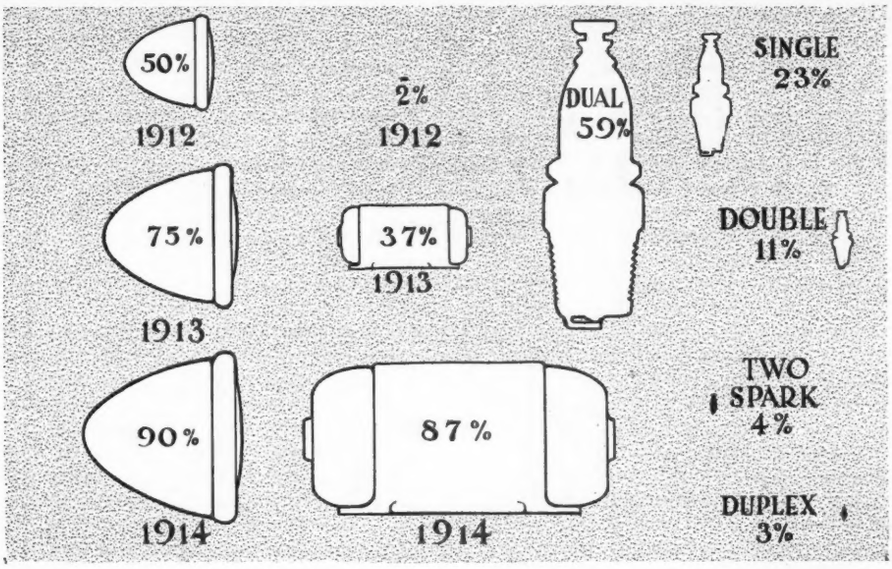
When the Grand Central Palace at New York opens its doors this week to the first American exhibition of the motor cars for 1914, the eyes of the motoring world will be turned to Manhattan for the first comprehensive review of the products of the industry for the new year. It has come to be the custom of the motoring fraternity to look to the New York shows for a concrete example of the progress in motor vehicle building during the preceding 12 months. This year no more than formerly will motordom be disappointed, for there will be many refinements of details, many developments of design, and a few novelties of construction.

A New Engine Type

Those who have followed the progress of car design will see the introduction in a commercial salable vehicle of a distinctly new type of motor, the one bearing the name of Mondex-Magic. The appearance of this motor marks the debut into the motor car field of a fourth type of engine, one distinct in principle of valve operation from any employed heretofore in America. It joins with the Knight sleeve-valve motors and the Mead rotary valve motor, which reappears after silence of a year. This motor also will appear at the show on another car, the Palmer-Singer, which announces its adoption for the coming season.

Another novelty in engine design is the new Premier engine in which the attempt is made to combine efficiency of an overhead poppet-valve motor with the silence of a non-poppet engine.

Prospective buyers of motor cars will find that their choice is more limited this year than it has been in many years. This is due to two reasons, one of them is the



Growth of electric cranking and lighting. At right, popularity of different ignition systems this season

fact that American manufacturers for 1914 are not building nearly as many different models of cars as they did last year. Two or 3 years ago a concern would have three or four different sizes of chassis, with perhaps a dozen different bodies fitted upon them, but now at least half of the manufacturers are producing but a single model. In this single-model program it is possible to produce cars much more rapidly.

Roll of Makers Shorter

Another, and nearly as potent a reason for the smaller number of cars for selection is that there are fewer concerns manufacturing cars this year. At the beginning of 1913 there were 156 manufacturers of passenger cars, whereas this year's field can boast but 133. A survey of the industry will show that there has disappeared from the ranks of cars on the market a number whose names have become familiar to the buying public but which, for one reason or another, are not among those produced for 1914. The mere statement that these cars have not answered the roll call does not mean in every instance that they are no longer being manufactured. In some instances it may be inferred that the plans of the manufacturers have not been decided upon at this time to an extent where they can be made known to the public. In a few others, litigation or difficulties in a financial way have made necessary the temporary suspension of activities. In most cases, however, it may be taken for granted that the fact that these cars are listed among the missing means a definite abandonment by their makers of the pleasure car industry.

The list of car names, which up-to-date have not appeared on the market for the new season, includes the Adams-Farwell, A. E. C., Alco, Alpena, Amplex, Bergdoll, Burg, Carhartt, Carroll, Cino, Columbia, Cutting, Duquesne, Halliday, Lion, Luck-Utility, Matheson, Michigan, Midland, Miller, Motorette, Omaha, Pacific, Perfex, R. C. H., Reeves, Schacht, Schlosser, Stoddard-Dayton, Triumph, and Warren. The Diamond T, which formerly has been included among those present, is not listing definite models as the cars are being built only to order.

New Nameplates This Year

In addition to those mentioned, there are a number whose name plates no longer adorn a 1914 product yet which remain in the 1914 market under new names. Such are the Edwards and Garford, which are combined as the new Willys-Knight; such, also, is the Lexington which makes its bow to the 1914 public as the Howard; also, there is the Little which now bears the name of a famous racing driver, Chevrolet; lastly, this condition applies to the Only from whose factory the new Metropol emerges.

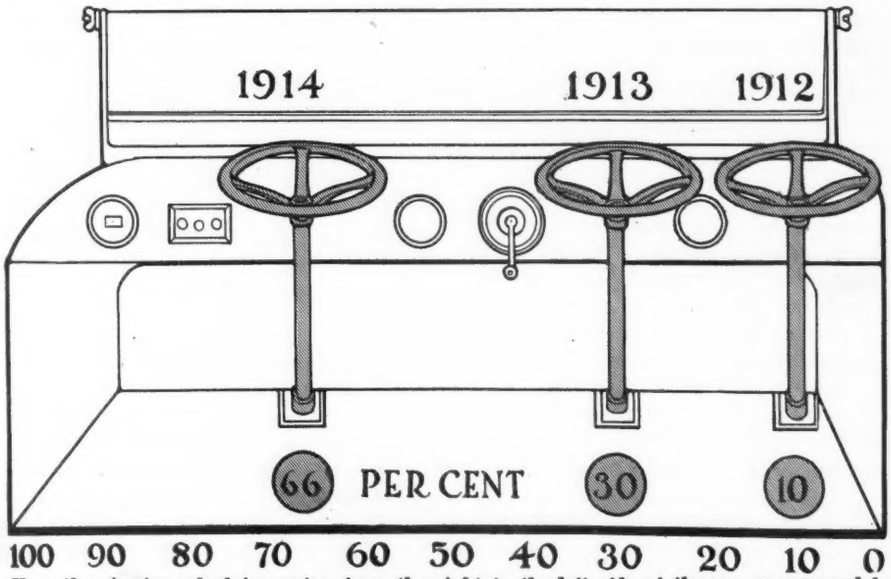
On the cars lined up this year for inspection, many unfamiliar name plates will be noticed, for there have been almost a score of new cars added to the industry since the beginning of 1913. Among these are the Allen, Chandler, Continental, DeSoto, Flyer, Howard, Jeffery—a brother of the Rambler—Lewis, Lyons-Knight, Meteor, Metropol, Monarch, Mondex-Magic, Partin-Palmer, Read, S & M., Saxon, Tribune, Vaughan, Vulcan and Willys-Knight.

Probably no better way than in the consideration of these cars can the two most striking tendencies of the new season be illustrated. A study of these will show that these debutantes in the field are brought out to meet a demand along two well defined lines. One of these is the trend of popular sentiment among the middle class of buyers toward the light inexpensive car—inexpensive in both first cost and that of maintenance. Such are the Flyer, Grant, and Saxon, all very light cars offered at less than $500. Such also are the Partin-Palmer and the Vulcan, the Meteor and the Monarch, all of which are sold at less than $1,000.

Light Cars Logical Development

This trend is one to be logically expected in America at this moment, in view of the great strides that are being made in what is termed the "light cars" in Europe. On the other side of the water the necessity for the introduction of the small car is greater than it is in America at the moment. The dual reasons of high price of gasoline and the high taxation based on the diameter of the bore of the cylinder lead the European motorist toward cars which in this country would be deemed unreasonably underpowered. These very small cars are perhaps more applicable to European roads than they are to American conditions on account of the almost invariably smooth roads throughout Great Britain.

It is a matter for discussion as to whether the light cars now appearing upon the American market will be benefitted or hurt insofar as their sales and



How the steering wheel is moving from the right to the left side of the car as expressed by the per cent of left-drive chassis for 3 years

production are concerned, by the advent of that latest and most radical development of the light weight and low cost cry, the cyclecar. Be that as it may, there must be a real demand for the ultimate in lightness and cheapness if the wonderfully rapid growth of the cyclecar idea is any criterion. A year ago the cyclecar was practically unheard of in America, and the few wise ones, who were in touch with European developments, regarded the little vehicle as a temporary plaything of English blacksmiths. At the moment, there are no fewer than thirty American manufacturers who have announced that they will have cyclecars on the market before next summer, and there are a dozen of them which have cars actually upon the road.

Influence of Cyclecars

It is reasonable to assume that the injection of this new influence in the motor car situation will have a tendency to cause a reduction in the price of those motor cars whose field might be expected to overlap that of the cyclecar. That it has not had an influence yet may be assumed from the fact that the average price of those cars which list under $1,250 has risen during the past year from $920 in 1913 to $950 for 1914. This increase, however, is due almost wholly to the increase in equipment supplied as stock on these cars, most of which are fitted with electric lighting and starting equipment and better furnishing in the way of tops, curtains, and other supplies.

The light car influence, or rather the economy influence, has had effect in a reduction in the size of the engines. This shows itself in a comparison of the average cylinder bore for the past 2 years, which has dropped from 4.19 inches in 1913 to 4.12 inches in 1914.

Another trend of the industry for the new year is represented by those cars appearing for the first time on the market, which do not come into the small-car field. This tendency is that toward the light six-cylinder cars and is illustrated by such new cars as the DeSoto, Howard, Lewis, Meteor, Mondex-Magic, S. & M., and Vaughan. The wonderful stride in popularity made by the six-cylinder car, particularly the light six, is treated in detail on other pages.

Along with those trends already mentioned, as making a distinct showing, is that of the left-hand drive as opposed to the right location of the steering wheel. During the past 12 months there has been an increase of 100 per cent in the cars adopting this feature. In 1913, 30 per cent of the different chassis models offered were arranged for left drive, but in the new cars 60 per cent of them, or twice as many, seat the driver on the left.

Automatic Gearshifts a Novelty

There has been one feature of the 1914 cars which is the bright and shining light in the way of radical changes, just as the adoption of engine starters was the outstanding feature of the 1913 season. This new star is the automatic gearshift and is dependent upon and comes as a sequel to the almost universal adoption of engine cranking arrangements.

Although automatic gearshifting is comparatively insignificant insofar as the number of cars adopting it is concerned, there being only four or five which fit this feature as stock equipment, nevertheless it is such a radical change from conventional efforts, and yet such a logical one, that it is worthy of particular attention. The Haynes, Norwalk, Pullman, and S. G. V. all have adopted the electric gearshift, while another car is credited with making the pneumatic gearshift optional.

Letting George Do It

The announcement of automatic gearshifting arrangements is a logical development of that demand for ease of operation which found its first expression in the production of electric lights, power tire pumps and curtains which could be attached and detached without operator or passenger leaving their seats. This luxury instinct was fostered by the general introduction of methods whereby energy, stored by the motor could be used to make it do its own cranking. These engine-cranking systems, the tire-inflating provisions, and the press-the-button lighting systems have led to a further demand for arrangements which will let "George do the work"——George in this case being the motor.

Adoption of automatic cranking systems has made automatic gearshifting possible. Our luxury-loving motorists fail to see why the engine could not be made to shift gears as well as crank itself, light the car, pump the tires, in addition to the performance of its natural function of transporting its owner. Automatic gearshifting depends on the utilization of the energy, whether in the form of electricity or air, stored up for electric cranking and lighting in the one case, or pneumatic starting and tire inflation in the other.

Another evidence of the maker's answer to this call for easy motoring is the adoption on so many cars of the so-called one-man top. This is comparatively a recent development but approximately 10 per cent of the manufacturers, particularly of the higher-priced cars are equipping touring cars with tops which can be raised or lowered by one man and that without getting out of the car.

All of these developments which make motoring more comfortable have had a secondary influence on the exteriors of the cars, and upon their interior furnishings, because they have made the gasoline motor car a pleasure rather than a source of hardship for the woman driver. With the increasing number of travelling motorists there has been a development of the esthetic side of the car no less definite than that of the mechanical side, a part of which is credited to Milady Motoriste.

Her eye for beauty has insisted upon more pleasing lines to the car as a whole, and her sportsmanship has joined with that of her brother motorist to insist that a car have the appearance of fleetness whether it be really speedy or no.

GASOLINE TANK IN COWL

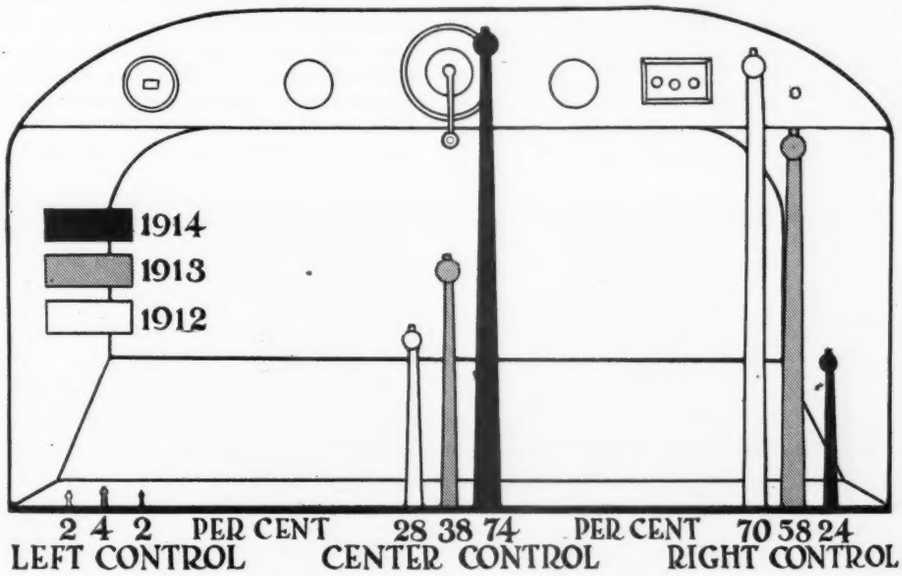
Alien	Holly	Mitchell
Cameron	Hudson	Ohio
Cartercar	Hupmobile	Paige
Continental	Jackson	Pathfinder
Croxton	Krit	Pullman
Falcar	Lambert	Studebaker
Grant	Lyons-Atlas	Traveler
Henderson		

CARS WITH WIRE WHEELS

Flyer A	S. & M., 14-48
Mondex Magic, 6-40	Keeton
Mondex Magic, 6-60	Grant, 21
Pullman, 6-46	Willys-Knight

CARS WITH WORM DRIVE

Lyons-Knight	Willys-Knight



Center control development during 3 years, with corresponding decrease in right control, the size of the lever indicating the per cent of chassis with this feature

SIXES NEW IN 1914.

Abbott-Detroit	*Lewis
American	Marion
Apperson	*Meteor
Buick	*Mondex Magic
*Chandler	National
Davis	Ohio
*DeSoto	Packard
Haynes	Pathfinder
Henderson	Richmond
*Howard	*S. & M.
Imperial	*Vaughan
Jeffery	Velie

*New makers.

Six Cylinders

SIX-CYLINDER engines continue to hold their amazing pace in their race for supremacy over the four. At this time last year it was considered an eighth wonder that the sextuple power plant had shown an increase of 100 per cent over the 1912 field, jumping from forty-eight to seventy-seven makers. It was freely predicted that there would be a decided slump in the popularity of the six before the 1914 sun rose over the horizon, and that the four-cylinder engine would regain its pristine supremacy.

Those pessimistic prophets were viewing the future through glasses of indigo it would seem from a view of this year's figures. Not only has the six-cylinder engine held its own in the matter of popularity but has made a decided gain and has embraced in its ranks a number of makers who heretofore have avoided with horror the suggestion of a six.

Though sixes cannot show as great a gain during the past 12 months as they did the year previously, the growth seemingly has been a healthy one. At this moment 45 per cent of the chassis offered on the American market for 1914 have six-cylinder motors. This is a gain of 25 per cent over last year.

Ninety Makers of Sixes

In the matter of manufacturers who have adopted six-cylinder engines as a part or the whole of their production program for 1914, the list numbers ninety, thirteen of whom have entered the six-cylinder field for the first time. Many of the makers, who have built sixes previously, have designed new ones which have been added to their list, and a number of new cars have made their debut as six-cylinder adherents.

Older makers who have turned their allegiance to the six-cylinder include the Abbott-Detroit, American, Apperson, Buick, Davis, Haynes, Henderson, Imperial, Jeffery, Marion, National, Ohio, Pathfinder, Richmond, and Velie. There are eight cars which make their first appearance at this time and which are six-cylinders. These are the Chandler, DeSoto, Howard, Lewis, Meteor, Mondex, S. & M., and Vaughan.

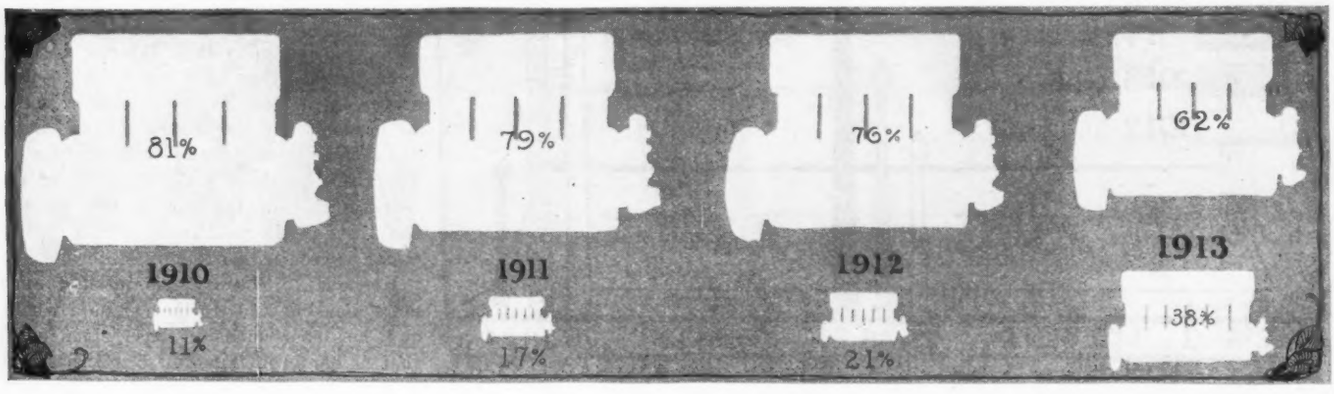
Shown by Diagram

Perhaps there is no better way to show the enormous growth of the popularity of the six-cylinder as compared with the four than by means of a diagram, and one of the charts on page 11 shows graphically the rise of the six and the fall of the four in popular estimation in the last 5 years. The line labeled six-cylinders is drawn through points representing the percentage of chassis with six-cylinder motors in 1910, 1911, 1912, 1913, and 1914, respectively, and the line marked four-cylinders represents similarly the percentage of fours for those years. It will be noticed that in 1910 only 10 per cent of the chassis models had six-cylinder power plants. This increased to 13 per cent in 1911, 19 in 1912, and then took a sudden jump to 36 per cent last year, and increasing more gradually this year to 45.

SIX-CYLINDER CARS

Car	Bore	Stroke
Abbott-Detroit	3.75	5.25
American	4.25	5.50
Apperson 6-45	3.75	5.50
Apperson 6-55	4.25	5.00
Auburn 6-45	3.75	5.25
Austin 55	4.00	5.00
Austin 77	4.50	7.00
Buick B-55	3.75	5.00
Chadwick 19	5.00	6.00
Chalmers 24	4.00	5.50
Chandler 14	3.375	5.00
Colby 6 C-60	4.125	5.25
Cole Six	4.25	5.25
Correja H	3.75	5.50
Crane	4.375	6.25
Crow-Elkhart	3.75	5.50
Davis 6-50	3.75	5.25
DeSoto Six	4.00	5.00
Fiat 56	4.375	6.00
Fire.-Col.	4.135	5.25
Franklin 6-30	3.625	4.00
Havers Six 44	3.75	5.00
Havers 60	4.125	5.25
Haynes 26, 27	4.25	5.50
Henderson Six	3.75	5.50
Herreshoff 6-40	3.375	4.50
Holly A1	4.00	5.00
Howard D	4.125	5.25
Hudson 6-40	3.50	5.00
Hudson 6-54	4.125	5.25
Imperial 44-6	3.75	5.25
Imperial 54-6	4.125	5.25
Inter-State 45	4.00	5.00
Jackson, Sultanic	4.125	4.75
Jeffery 96	3.75	5.25
Keeton	3.75	5.50
Kisselkar 48	3.75	5.50
Kisselkar 60	4.50	5.25
Klinekar 6-50	4.125	5.50
Klinekar	4.32	5.75
Knox 46	4.375	5.50
Knox 66	5.00	5.50
Lenox 6	4.00	5.00
Lewis Six	3.50	6.00
Locomobile 38-LD	4.25	5.00
Locomobile 48-LD	4.50	5.50
Lozier 77	3.875	5.50
Luverne 7-60	4.00	6.00

According to the figures for the 4 years preceding, it would have seemed last year that 1914 would see more sixes in the field than fours. But it was to be expected that the percentage of sixes would begin to increase less rapidly within a short time as those who were able to buy



The four-cylinder motor overshadowed the six in 1910, but during the last 4 years the number of sixes has grown until there are nearly as

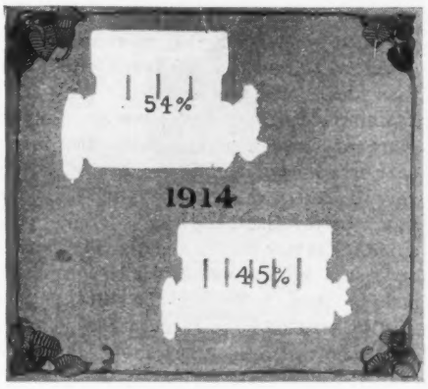
In the Ascendant

Light Sixes a 1914 Development

SIX-CYLINDER CARS

Car	Bore	Stroke
Marion G	3.75	5.00
Marmon 48	4.50	6.00
Marmon 41	4.125	5.50
Maxwell 50-6	4.125	4.75
McFarlan	4.00	6.00
Meteor W-6-45	3.75	5.00
Mitchell Little Six	4.25	6.00
Mitchell Big Six	4.25	7.00
Mondex, Magic 6-40	3.375	4.75
Mondex, Magic 6-60	4.00	5.625
Moon 6-50	3.75	5.25
Moyer G	4.50	5.00
National Six	3.75	5.50
Norwalk D	3.875	5.00
Norwalk C	4.00	5.50
Oakland M-48	3.50	5.00
Ohio, Royal	4.00	6.00
Oldsmodile D-54	4.25	5.25
Packard 238	4.00	5.50
Palmer-Singer	4.00	5.00
Palmer-Singer 50	4.00	5.50
Pathfinder, Leath'stg	4.125	5.25
Peerless 38-6	4.00	5.50
Peerless 48-6	4.50	6.00
Peerless 66	5.00	7.00
Pierce-Arrow 38 C-2	4.00	5.50
Pierce-Arrow 48 B-2	4.50	5.50
Pierce-Arrow 66 A-2	5.00	7.00
Pilot	4.00	6.00
Premier	3.625	5.50
Premier 6-48	4.	5.50
Pullman 6-46	3.75	5.25
Pullman 6-66	4.375	5.50
Rayfield D	4.00	5.50
Republic E	4.25	5.00
Richmond T	4.00	4.50
S. & M. 14-48	3.75	5.25
Speedwell H	4.125	5.25
Staver 65-A	4.00	6.00
Stearns-Knight Six	4.25	5.75
Studebaker Six	3.50	5.00
Stutz 6-E	4.00	5.00
Touraine 12	4.00	5.00
Vaughan Six	3.75	5.50
Velie	3.75	5.25
White GF	4.25	5.75
Winton 20	4.50	5.50
Zimmerman B-6	4.00	5.00

six-cylinder cars became supplied and the demand therefore might be expected to fall off somewhat. Likewise it was to be assumed there would always be an active market for the four-cylinder and that both curves should commence to approach a horizontal, indicating a constant demand.



many sixes as fours for this year's market

Such has proven to be the case and it may be expected that 1915 will see an even smaller increase in the proportion of six-cylinder cars.

There is a feature of the six-cylinder car for this year which is more worthy of note, even, than its increase in popularity, and which probably is accountable for this increase. This feature is the lower price at which the sixes are selling. There were a few six-cylinder cars listed at a price less than $2,000 last year, but the number has increased for the 1914 season to nine. The lowest-priced six on the market is the new Richmond which sells at an even $1,500; the other new cars in this class, the Lewis and the Meteor, are next at $1,600 even.

Many Sixes Around $2,500

The class of cars selling in the neighborhood of $2,500 is the one that has shown the greatest increase in sixes, this numbers thirty this year as against only fifteen last year, and the price in this class has been lowered quite perceptibly. Most of these cars are listed at something under the $2,500 notch, averaging probably about $2,200.

In the class of cars selling at $3,000 or more, the increase in sixes is not so apparent; in fact, it is relatively stationary with last year's figures, although there are at least three cars, the Mondex-Magic, S. & M. and the Vaughan, in this classification which have not been on the market before.

It will be noticed that most of the new sixes for this year are what is known as the light-six type, having a motor whose bore is 4 inches or under. The favorite size of the six-cylinder cars is a 3¾ by 5¼-inch motor, and next in popularity in motor size of sixes is the 3¾ by 5-inch, and the 4 by 5-inch motor. The same demand for economy of operation, which permeates the motor car field, as a whole, is infused in the six-cylinder market, and it has been the endeavor of designers of the new sixes to produce a car which can compete favorably with the four-cylinder motor on gasoline consumption and tire mileage basis.

Efforts to obtain economy have resulted in some decided refinements in the engines new and redesigned for this season. Probably the chief step made was in the smaller cylinders. The piston displacement being about 10 per cent less than last year and the tendency toward greater excess of stroke over cylinder diameter being more pronounced. There also has been a decided lightening of the motor obtained by the use of die castings wherever possible, by the use of lighter alloys for the reciprocating parts, and by the use of pressed-steel crankcases, etc., and by the redesigning of certain parts.

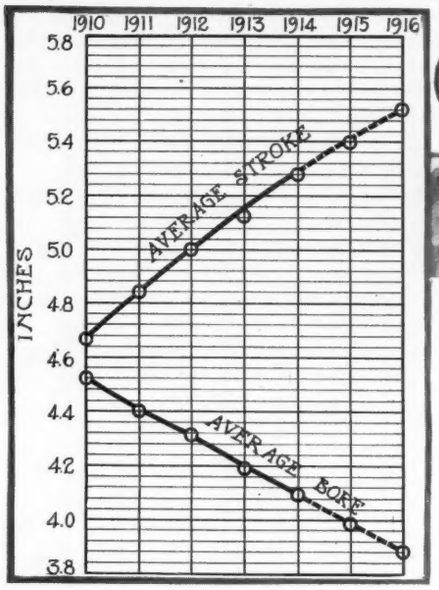
Also, successful attempt has been made to utilize more thoroughly the energy in the gasoline and thus cut down the fuel consumption. This has been obtained by waterjacketing the intake manifold, by heating the intake air, by larger valve openings, and by better design of intake and exhaust passages.

Two New Designs

In two instances entirely new motor designs have been employed to effect this economy. One of these is the new Premier six in which the efficiency of the valve-in-the-head motor is combined with the silence and lack of valve-mechanism difficulties obtained with the other types. This is accomplished by the use of a worm-driven overhead camshaft which is completely inclosed. Perhaps the most unique design in sixes is that of the Mondex-Magic, which employs the Fischer type of motor, a non-poppet valve arrangement employing parts of sleeves which have an oscillating motion around the cylinder as well as an up-and-down sliding motion like the Knight.

Another way by which economy is provided is by eliminating excessive wear of the valve operating parts by forcing oil to all portions of the mechanism which tap together or rub together. This is done in the new Marmon six by forcing oil up through the pushrods to the tappet surfaces and is accomplished in the new Premier six by inclosing the whole mechanism in an oil-tight housing, and squirting oil all over the cams and pushrods through a hollow cramshaft.

The light six has been accomplished, also, by combining cylinder castings, most of the new sixes having their cylinders cast in a single block, while a number are cast in two blocks of three cylinders each. The block casting gives a decidedly lighter motor and also gives the requisite rigidity to the crankshaft with a minimum number of bearings. Three bearings are the rule in the block cast engines and also in those which are cast in threes. In practically every instance of block casting the cylinder heads are removable as a unit and in most of the sixes in which there are two cylinder castings, there is a removable cylinder head for each set. Among the new sixes with block-cast cylinders are the Herreshoff, Lewis, Maxwell, Oakland, Ohio, American, Apperson, Correja, Henderson, Kisselkar, National, Rayfield, Studebaker, Vaughan, Premier, McFarlan. Of those cast in two sets of three each we have the Hudson, Abbott, Chalmers, Davis, Holly, Howard, Imperial, Marion, Moon, Palmer-Singer, Pathfinder, Pullman, S. & M., Speedwell, Velie, Crane Mondex, and Norwalk.



Change in average bore and stroke for 5 years and tendency for the next two seasons

Simplicity and Economy Features of the Year

By Harry A. Tarantous

MOTOR car engineers have been working toward the unification of the motor, toward making it a one-piece job as nearly as possible, to bring it to a point where it will show longer life, increased accessibility of the parts, simplicity, and above all economy in fuel and maintenance. The engineers' trinity may be said to have been, unity in construction, by decreasing the number of separate parts, simplicity in design and economy in operation.

Unit Power Plant a Feature

Whenever unity is mentioned in connection with motor cars, the idea of simplicity strikes one immediately and 1914 is the year in which the pinnacles of power plant construction have been reached with the prevelant knowledge of design, materials and motor buyers' wants. One of the best examples of the effort on the part of American engineers to produce in units is the change from the separate motor and gearset to the unit power plant type. In 1913, 46 per cent of the American cars had amidships gearsets, while 34 per cent had unit power plants, but 1914 sees the unit power plant in the lead with a 43 per cent following, while the nearest approach is the amidships location with 39 per cent adherents.

The bringing together or unification of the gearset and motor does not constitute the limit of this one-piece idea. Block castings have risen from 29 per cent in 1913 to 39 per cent in 1914, the pairs and separately cast cylinders having lost ground. Perhaps the unit power plant construction has been brought to its highest point in the new Premier, the Weidley-motored creation which not only has the motor and gearset a unit, but incorporates the radiator also. In this power plant, the cylinders and crankcase are cast integrally, and the cylinder head is another unit. An instance in multi-function castings is the water pump which serves, as a pump housing, connection from readiator to pump, starting crank bearing, radiator support, front motor support, and holds the thrust bearing at the end of the crankshaft.

Block Castings the Slogan

Block casting is the slogan for the sixes this year. Indications last year pointed toward a rise in the block six motor, but the figures show a greater increase than was expected this year, showing 45 per cent of the chassis with six-cylinder motors as against 36 per cent last year.

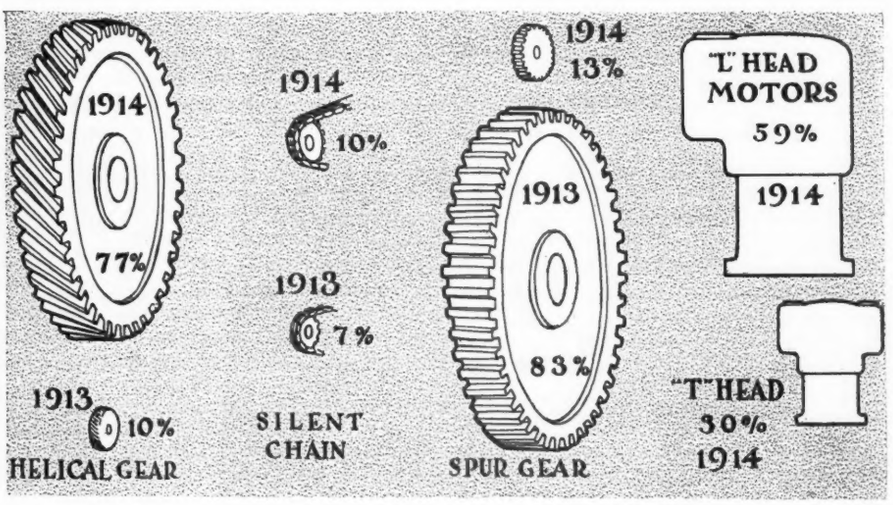
More than ever before have American engineers cut the bore until now the average has reached the low figure of 4.12 inches, a decrease of almost .1 inch from the 1913 average. Even more pronounced than this drop in the bore has been the rise in the stroke, the 1914 average being 5.28 inches as against 5.15 in 1913. This tendency toward small bore and long stroke is more clearly seen by comparing the stroke-bore ratios of this and last year, the respective figures being 1.23 and 1.28.

Less Horsepower This Year

Owing to the drop in the bore a proportionate lowering in the S. A. E. horsepower is noticeable and a rise in the piston displacement. The reason for this is accounted for in the greater production of the six-cylinder car whose bore is small and displacement high. In 1913 the average horsepower rating was 33.6 and the displacement 345 cubic inches while 1914 sees these figures 33.2 and 349 respectively. The drop in bore, rise in stroke, and corresponding changes in horsepower and displacement were expected by many familiar with the trend in America, and some have attributed this to the influence of foreign practice upon American engineers. The majority of our enterprising designers journey to Europe each year and bring home a neucleus of foreign realities. This has been going on year in and year out and still the average American bore and stroke figures do not coincide with the foreign. However, curves plotted show that the stroke and displacement will rise for next year, and the bore and horsepower will drop, in accordance with European ideals.

Motor efficiency has come in for its share of encomiums, for with the introduction of new metals, the use of larger valves, better valve timing and cam design, better methods for driving the auxiliary motor shafts and the elimination of many heretofore divided parts and making them into one, the 1914 motors may be said to have reached the point in efficiency which is appreciably ahead of that attained formerly.

The more extended use of tungsten steel



Illustrating the trend in timing drive, the loss of plain spur gears and the rise in helical gears and silent chains. At the right is a graphic comparison of the popularity of L-head and T-head motors this year

Power Plant Practice

Lighter Parts and Greater Power in New Engines

valves to prevent pitting and warping is a noted change, a great many of the 1914 cars using this metal so as to help reach one of the engineers' trinity, economy in operation. Valve grinding is eliminated almost entirely when tungsten steel valves are used and the greater efficiency obtained due to more perfect valve seating has warranted the change from the plain cast iron. There are innumerable other instances where economy has been made the goal, lighter reciprocating parts being one of the most important means to this end. The use of new piston and connecting rod material or by redesigning these members so as to reduce weight has been studied seriously.

Better Economy the Rule

Metallurgists have done much toward decreasing the fuel consumption of motors, but the engineer whose design has made economy a feature has done more. Because the fuel problem is becoming more important each year, valve timing and cam design have been given a great deal of attention, for with these properly worked out the fuel consumption may be reduced considerably. Increasing the diameter of the exhaust valves enough to permit the burned charge to escape completely, has not been overlooked.

Experiment has played a great part in motor production. One prominent motor manufacturer when asked for a method of obtaining the piston-to-cylinder clearance of his motor, which ordinarily is formula-calculated or taken arbitrarily, replied that only experiment gave him the correct figure. He tried various clearances and adopted the smallest one which would prevent piston slap to the greatest extent and still not cause binding.

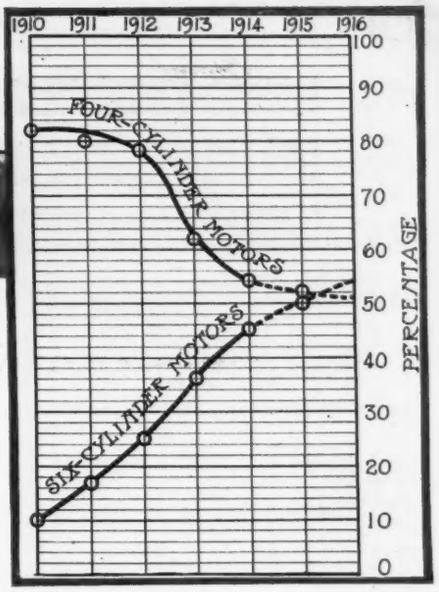
Heretofore the common type of piston ring was thought unexcelled, but now the use of especially-constructed rings to prevent gas leakage and oil rising above the piston top is more in evidence than ever before. Quieter motor operation, has been accomplished by the greater use of silent chain drive and helical motor gears. Seventy-seven per cent of the motors are using helical-gears as against 10 per cent silent chain and 13 per cent spur gear. This shows a tremendous rise in the first mentioned type, the 1913 figure being only 4 per cent. The silent chain drive has risen only slightly, last year showing 7 per cent of the motors so equipped. Some of the newcomers to the field have adopted the silent chain drive, the Chandler, Lewis, and Willys-Knight being three examples. Among the continued users may be mentioned, Kisselkar, Velie, Cadillac and Hupmobile.

CARS WITH UNUSUAL ENGINES

CAR NAME.	MOTOR.
Stearns-Knight	Knight
Lyons-Knight	Knight
Moline-Knight	Knight
Willys-Knight	Knight
Premier	Weidley
Palmer-Singer	Fischer
Mondex-Magic	Fischer
Speedwell	Mead
Duryea	Two-cycle

Simpler Motors This Year

Simplicity, a third component of the engineers' trinity, always has been a feature. The increase in the number of L-head cylinder castings is but one indication that simplicity has been striven for, and in many instances the change from pair-cast to block-cast is another. The block-cast six-cylinder motor of L-head construction has advanced rapidly within the past year, the tendency being attributed to the desire to produce a simple motor which is not costly, one which is efficient and yet in demand by the buying public.

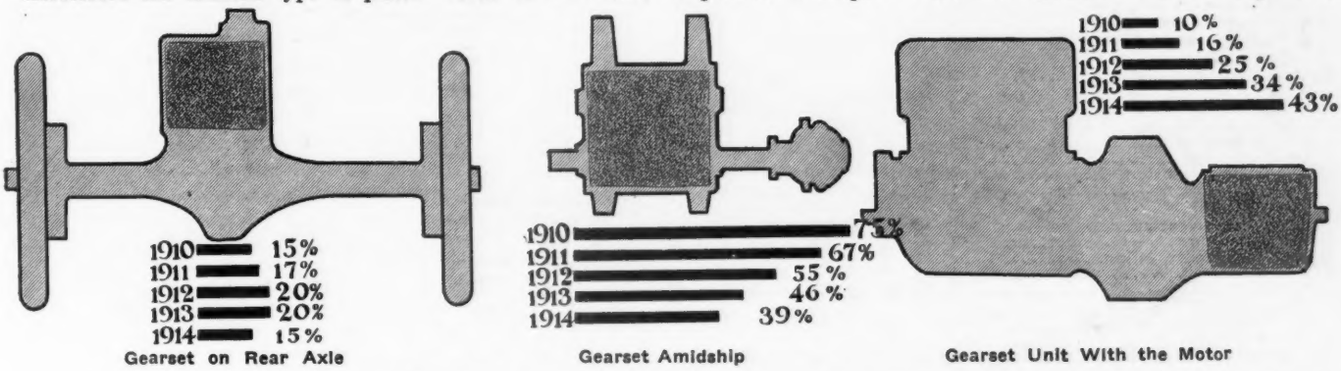


Growth in popularity of the six for 5 years with prognostication for 1915 and 1916

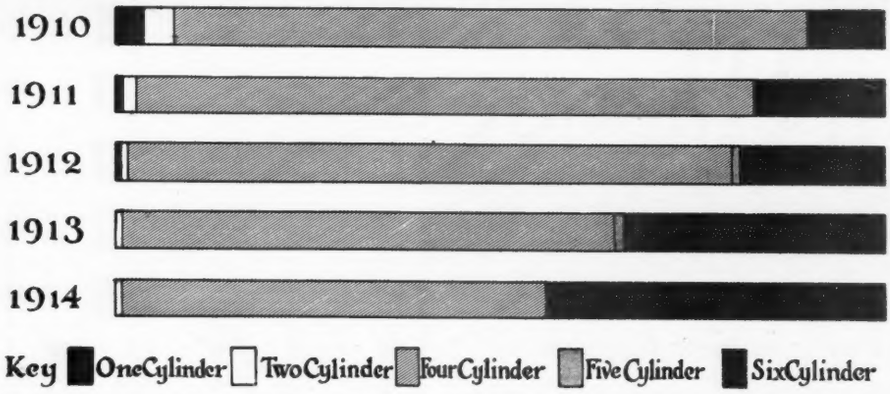
Accessories More Accessible

Constructional simplicity has made valve adjustments easier, and in the cases where removable cylinder heads are employed, carbon scraping and cylinder inspection also. The motors have been designed with the untalented owner in mind, the owner who is not a mechanic. The motor accessories have been brought to view more than before. The carbureter has been taken from far below the frame to a point almost on the level with it, so that every part is clearly seen and working by the sense of touch need no longer be relied upon. The magneto in majority of instances has been made removable quickly, the cranking and lighting units when mounted on the crankcase having the same feature.

Aside from simplicity and construction which has brought about ease of adjustment and removal and replacement of parts, the absence of complications has been carried a step farther. Motor wires are placed in conduits, the wires are numbered, and the terminals are of the simple, quick-removable type. The wire carrying ducts are fastened in such a way as to



Graphic illustration of the growth of the unit power plant idea during 5 years, with effect on the rear axle and amidship gearset



Comparative popularity of motors of different numbers of cylinders in five seasons—How the six is usurping the field of the four

add to the symmetry of the motor, for besides tending toward a high standard mechanically the engineers have not overlooked cleanliness.

Carbureter and Magneto Improvement

The motor accessory manufacturers have played a little part in producing simple motors. The carbureter and magneto, have been designed so as to make them more efficient, more easily handled and simpler in adjustments. The addition of hot air intakes and the use of water-jacketed carbureters is almost universal, this undoubtedly being caused by the low-grade fuel on the present market. There was a time when none but an expert could adjust the carbureter, but this year's carbureter catechism contains a few lines of instructions which are sufficient for the owner to do the work satisfactorily. Dash air controls are more in evidence, making it unnecessary for one to leave the seat to get the proper starting mixture.

Predicts Single Ignition

Not long ago, a prominent magneto engineer commenting on motor simplicity was quoted as saying that in a few years single ignition would be as characteristic of American cars as it is of European, and from present indications his statement has much value. In 1913 fifteen per cent of the motors, use this type, while 1914 sees a rise of 8 per cent. The dual and double systems have suffered because of the tendency toward single ignition.

Oiling Arrangements

Both pressure and splash-pressure-oiling systems have gained followers while the splash has lost. The drilled crankshaft idea is used by a number of makers, while direct leads to the motor bearings has its clientele. Marmon, Fiat, Pierce-Arrow, Winton and Willys-Knight are a few using pressure feed and Chalmers, Hudson, Hupmobile, Packard and Locomobile are splash-pressure admirers. Of all the chassis on the American market 42 per cent use pure splash, 39 per cent both splash and pressure and 18 per cent pressure.

Five motor types are on the 1914 market, these being the poppet, the Knight, the rotary valve the two-cycle and the Mondex-Magic special. The first mentioned is still dominant while the Knight is second, and shows the addition of a number of new makers. The converts are Lyons-Knight, Willys-Knight, Moline-Knight, two of these the Lyons and Willys, being earlier Knights redesigned. The Stearns retains the Knight motor for 1914. The two-cycle motor is used on but one make, the Duryea, the rotary valve by the Speedwell only and the special Fisher motor by the Mondex-Magic and the Palmer-Singer for 1915.

Comparisons of Features of the Average American Car for Five Years

GENERAL AVERAGES.....	1914	1913	1912	1911	1910
Horsepower, S. A. E. rating	33.2	33.60	33.60	32.7	31.5
Bore	4.12	4.19	4.34	4.42	4.85
Stroke	5.28	5.15	4.97	4.46	4.68
Stroke-bore ratio	1.28-1	1.23-1	1.09-1	1.01-1	1.03-1
Piston displacement	349	345	316.2	313.2	281.5
Wheelbase	121	122	121	114	112
Gear ratio	3.6-1	3.57-1	3.62-1	.....	.....
Tires	35x4½	35x4½	35x4	34x4	34x4
Number cars	607	.....	.....	.....	.....
Number chassis	236	339	381	393	364
Number makes	133	156	193	270	239
Price	$2,635	$2,585	$2,508	$2,560	$2,214
PERCENTAGE					
Number of cylinders.					
One cylinder	0	0	1	1	5
Two cylinders	1	1	1	2	3
Four cylinders	54	62	78	80	82
Five cylinders	0	1	1	0	0
Six cylinders	45	36	19	17	10
Shape of cylinders.					
T-cylinder type	30	31	30	22	20
L-cylinder type	59	56	55	60	56
I-cylinder type	6	9	9	14	18
Knight type	3	3	2	1	0
Two-cycle	1	1	4	3	6
Mondex-Magic type	1	0	0	0	0
Cylinder arrangement.					
Cylinders cast separate	6	15	22	28	39
Cylinders cast in pairs	42	48	58	60	53
Cylinders cast in block	39	29	18	12	8
Cylinders cast in threes	13	8	2	0	0
Cooling.					
Air-cooled	2	4	5	6	7
Thermo-syphon	19	17	19	28	23
Pump circulating	79	79	76	66	70
Ignition systems.					
Single ignition	23	15	14	18	25
Dual ignition	59	68	63	53	40
Two-spark ignition	4	2	0	0	0
Double ignition	11	15	23	29	35
Duplex ignition	3	0	0	0	0
Motor lubrication.					
Splash oiling	42	53	68	81	0
Splash-pressure oiling	39	32	20	0	0
Oil in fuel	1	1	2	3	6
Pressure oiling	18	14	10	19	0
Engine starting.					
Electric starter	87	37	2	0	0
Acetylene starter	1	14	0	0	0
Air starter	4	9	2	1	1

PERCENTAGES.	1914	1913	1912	1911	1910
Optional starter	2	5	0	0	0
Mechanical starter	1	4	0	0	0
No starter as stock.....	5	31	98	99	99
Fuel feed.					
Gravity fuel feed	58	65	0	81	82
Gravity-pressure fuel feed	1	0	0	0	0
Pressure fuel feed	41	35	0	19	18
Gas tank location.					
In cowl	13	..	..	..	..
At rear	41	..	..	..	..
Under seat	46	..	..	..	..
Type of clutch.					
Disk clutch	48	52	44	51	49
Cone clutch	41	45	52	47	39
Expanding band clutch	3	1	3	2	6
Contracting band clutch.....	5	2	1	1	3
None	3	..	..	..	..
Type of Gearset.					
Selective	95	94	92	90	85
Progressive	1	2	5	1	8
Planetary	1	1	2	4	4
Friction	3	3	1	5	3
Location of gearset.					
Amidship	39	46	55	67	75
Unit with axle	15	20	20	17	15
Unit with motor	43	34	25	16	10
None	3	..	..	..	..
Steering and control.					
Right steering right control	24	58	70	81	93
Right steering center control...	10	13	15	11	4
Left steering center control....	57	25	13	6	2
Left steering left control.....	2	4	2	2	1
Optional steering	4	0	0	0	0
Electric gearshift (Left steering)	3	0	0	0	0
Wheels.					
Wire wheels-demountable	4	3	0	0	0
Wood wheels	96	96	100	100	100
Final drive.					
Shaft and bevel	93	94	92	91	89
Chain	4	4	6	8	11
Shaft and worm	1	1	1	0	0
Roller	1	1	1	1	0
Shaft and worm-bevel	1	..	..	..	..
Type of axle.					
Floating	65	67	50	0	0
Semi-floating	17	26	49	0	0
Three-quarter floating	14	4	0	0	0
Seven-eighths floating	1	0	0	0	0
Dead rear axle.....	3	3	1	0	0
Timing gear drive.					
Spur gear	13	83	..	..	..
Helical or spiral gear.....	77	10	..	..	..
Silent chain	10	7	..	..	..

Cars of 1914 Illustrated

IT has been the custom of Motor Age to reproduce annually representative cars with each of the various body types in a comprehensive illustrated review. Complying with this custom Motor Age on the following pages offers a pictorial review of the cars of 1914. From the viewpoint of artistic development, a study of the bodies for this year will show that immense strides have been made in the past twelvemonth. The streamline formation of the car body as a whole that was just beginning to make itself evident at this time last year, now has become the rule. Wherever bodies have been redesigned there has been an attempt toward the long, smooth, flowing lines, and in nearly every case the attempt has resulted in much improvement esthetically, while the more practical, but no less important aspect of comfort has been enhanced simultaneously.

There is one development in body design which is peculiar to this year. This development is the double-purpose body which is adapted to be transformed easily from an open body to an enclosed one. This tendency has made itself felt mostly in the realm of the cars of smaller seating capacity, practically all the development along this line being in the combination of the coupe and the roadster or runabout. Nine different car makers are offering such combinations, which, though they appear under different names, all have the same object in view, that of an easily convertible coupe-roadster. Among the cars which answer this description are the Cadillac landaulet-coupe, the Hudson cabriolet, the Jeffrey coupelet, the Keeton convertible, the Kline convertible coupe-roadster, the Oakland cabriolet, the Stevens-Duryea coupelet, the Pathfinder cabriolet and the Studebaker landau-roadster. The Keeton also appears as a five-passenger convertible.

Coupés and Landau Roadsters

FRANKLIN 630 3PASS. $2950

WHITE 40GE 3 PASS. $4100

The coupé is quickly gaining ground as an all-year car. Here is shown the National 40, 3 pass., $3,500.

STUDEBAKER 6 2 PASS. $1950

HAYNES 6 26 4 PASS. $3200

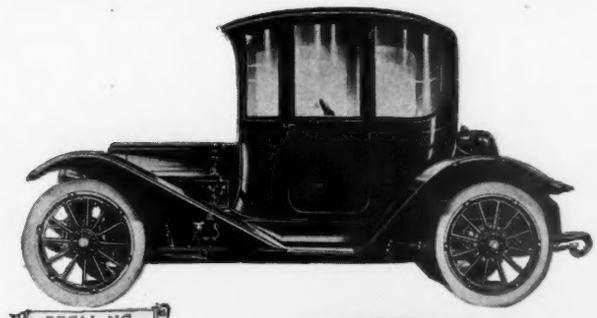
HUDSON 6 40 2 PASS. $1950

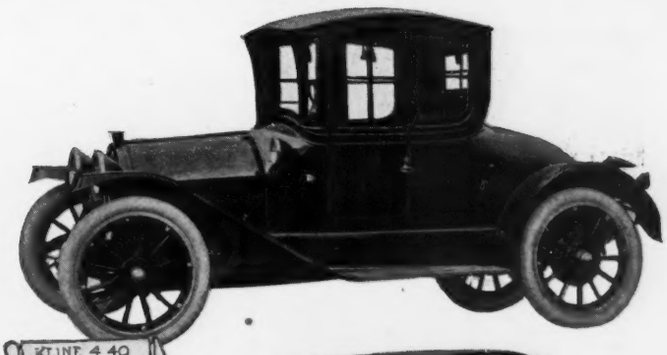
OVERLAND 70 4 PASS. $1550

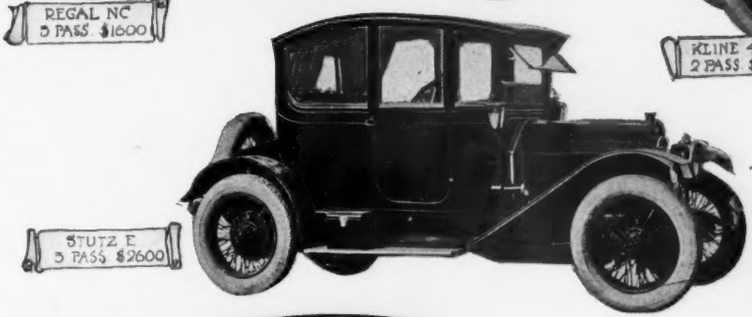
McFARLAN 67T 4PASS $3300

CADILLAC 3 PASS. $2500

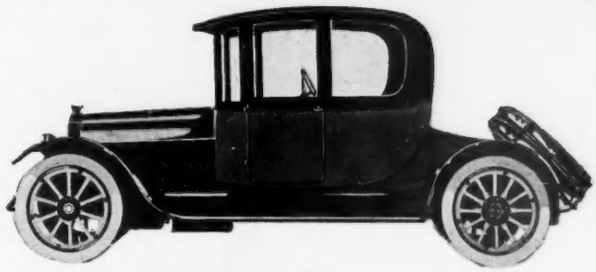
MARION 6 G 4 PASS. $2650

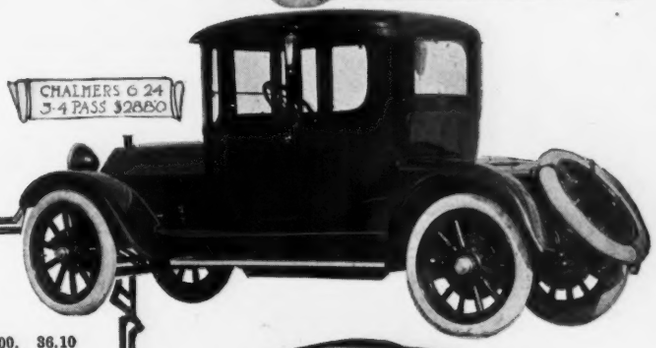

REGAL NC
5 PASS. $1600


KLINE 4 40
2 PASS $2585


STUTZ E
5 PASS $2600

CARTERCAR 5C 5PASS $1900


MOON 42 4 PASS $2350


CHALMERS 6 24
5-4 PASS $2880

Details of Coupes Illustrated

National, $3,500. 57 H.P., 120 or 128-inch W.B., 36 x 4½-inch tires.

Studebaker Six, two-passenger, landaulet roadster, $1,950. 29.40 H.P., 121-inch W.B., 34 x 4-inch tires.

Hudson 6-40, two-passenger cabriolet, $1,950. 29.40 H.P., 123-inch W.B., 34 x 4-inch tires.

McFarlan 67 T, four-passenger, $3,300. 38.40 H.P., 128-inch W.B., 36 x 4½-inch tires.

Marion Six, four-passenger, $2,650. 33.75 H.P., 124-inch W.B., 35 x 4½-inch tires.

Franklin 6-30, three-passenger, $2,950. 31.60 H.P., 120-inch W.B., 34 x 4½-inch tires.

White 40 G.E., three-passenger, $4,100. 22.50 H.P., 110-inch W.B., 34 x 4-inch tires.

Haynes Six 26, four-passenger, $3,200. 43.80 H.P., 130-inch W.B., 36 x 4½-inch tires.

Overland 79, four-passenger, $1,550. 27.25 H.P., 114-inch W.B., 33 x 4-inch tires.

Cadillac 1914 three-passenger, $2,500. 32.60 H.P., 120-inch W.B., 36 x 4½-inch tires.

Regal NC, three-passenger, $1,600. 22.50 H.P., 108-inch W.B., 34 x 4-inch tires.

Stutz 4-E, three-passenger, $2,600. 36.10 H.P., 120-inch W.B., 36 x 4½-inch tires.

Moon 42, three-passenger, $2,350. 32.40 H.P., 118-inch W.B., 34 x 4-inch tires.

Henderson, De Luxe 58, three-passenger, $2,285. 27.25 H.P., 116-inch W.B., 35 x 4½-inch tires.

Kline 4-40, two-passenger, detachable-coupé roadster, $2,585. 29.71 H.P., 120-inch W.B., 37 x 5-inch tires.

Cartercar 5C, three-passenger, $1,900. 27.25 H.P., 116-inch W.B., 36 x 4-inch tires.

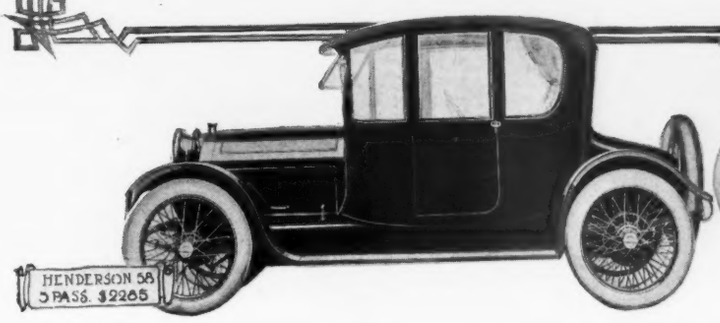
Chalmers Six 24, three and four-passenger, $2,880. 38.40 H.P., 132-inch W.B., 36 x 4½-inch tires.

Hupmobile H, three-passenger, $1,350. 16.90 H.P., 106-inch W.B., 33 x 4-inch tires.

Herreshoff 4-30, two-passenger, $1,650. 18.25 H.P., 110-inch W.B., 32 x 3½-inch tires.

In addition to these the following makes of coupés are not illustrated on these pages: Abbott-Detroit, American, Apperson, Arbenz, Buick, Cole, Dispatch, Firestone-Columbus, Jeffery, Keeton, Kisselkar, Locomomobile, Lozier, Packard, Paige-Detroit, Pathfinder, Peerless, Stearns, Rayfield, Winton.

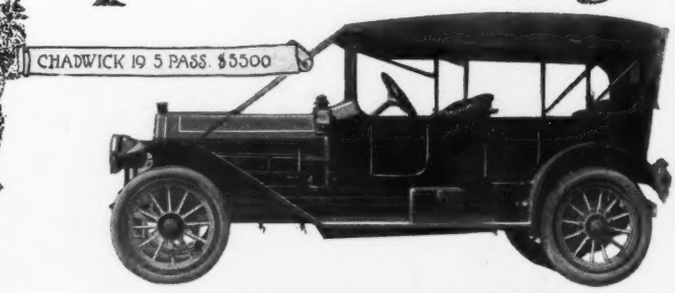
HUPMOBILE H
5 PASS $1350


HENDERSON 58
5 PASS. $2285

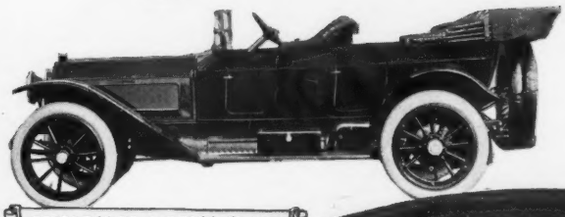
HERRESHOFF 2 PASS $1650

Touring

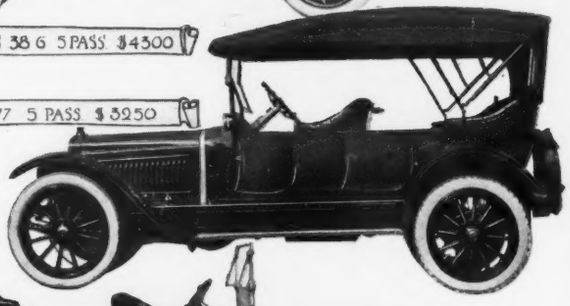
LOCOMOBILE 6 5 PASS $4400



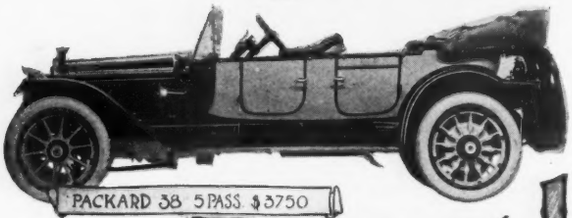
CHADWICK 19 5 PASS. $5500



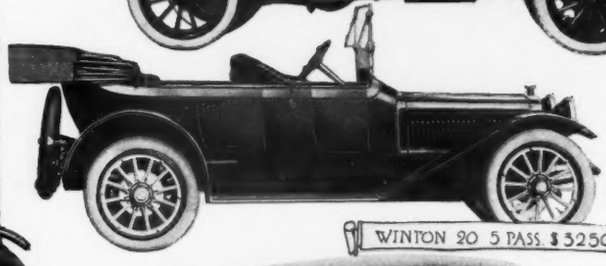
PEERLESS 38 6 5 PASS. $4300



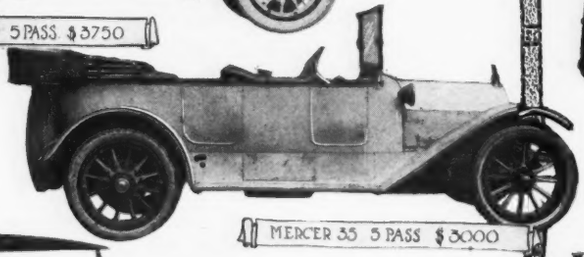
LOZIER 77 5 PASS $3250



PACKARD 38 5 PASS. $3750

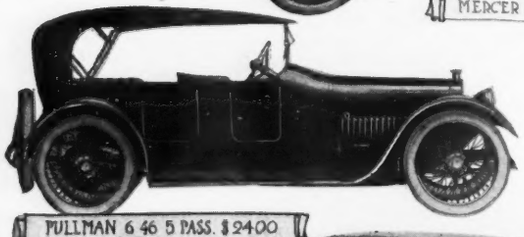


WINTON 20 5 PASS. $3250

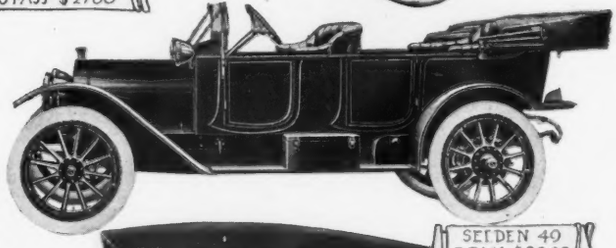


MERCER 35 5 PASS $3000

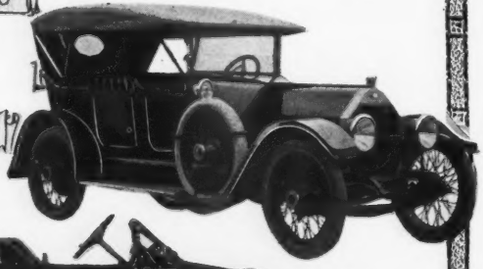
GARFORD G 17 5 PASS $2750



PULLMAN 6 46 5 PASS. $2400

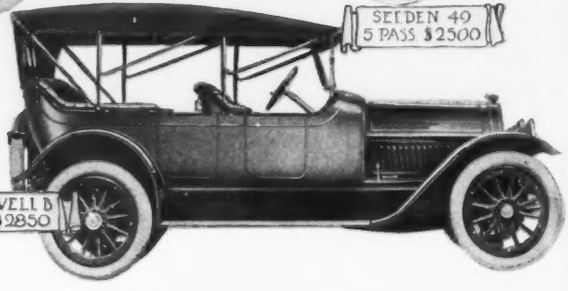


SEIDEN 40 5 PASS $2500



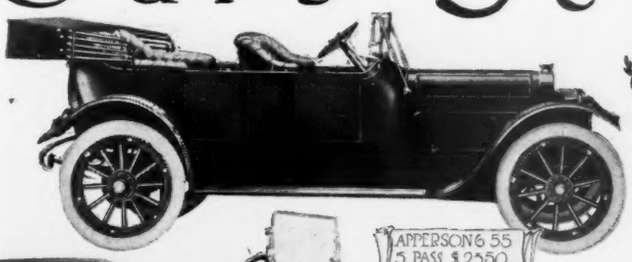
S & M 5 PASS. $2500

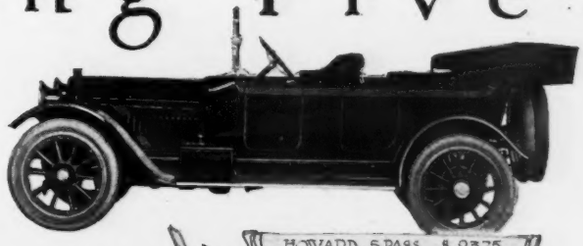
FRANKLIN 630 5 PASS. $2300

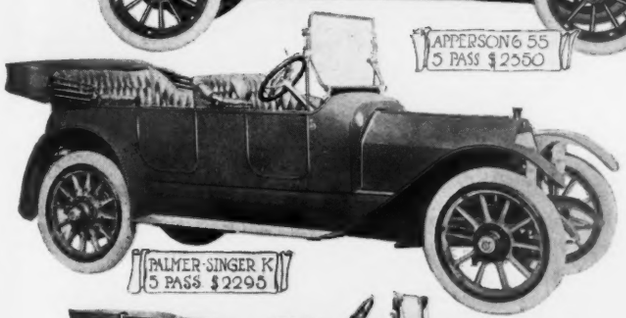


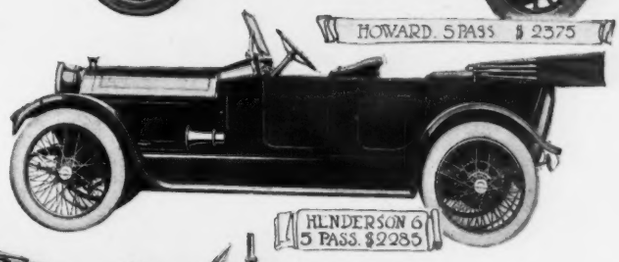
SPEEDWELL B 5 PASS. $2850

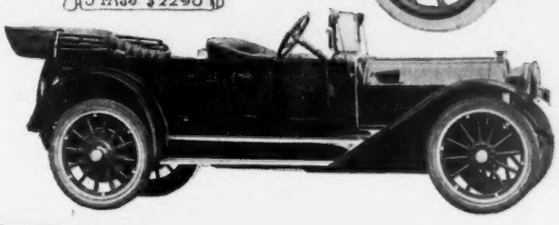
Cars Seating Five

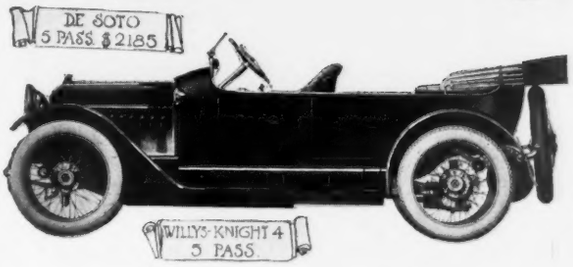


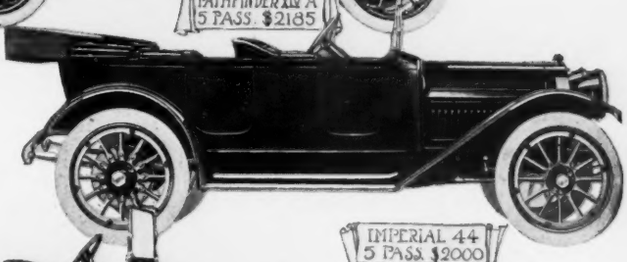


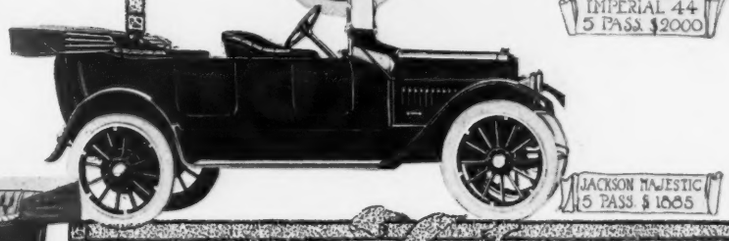


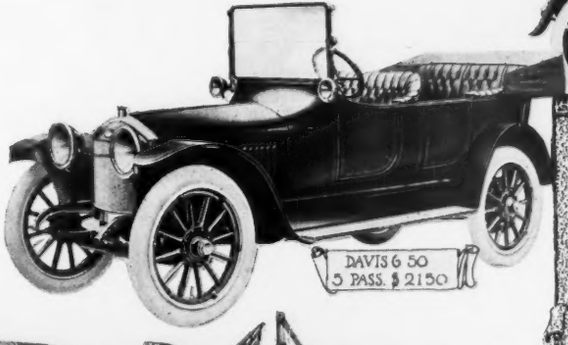


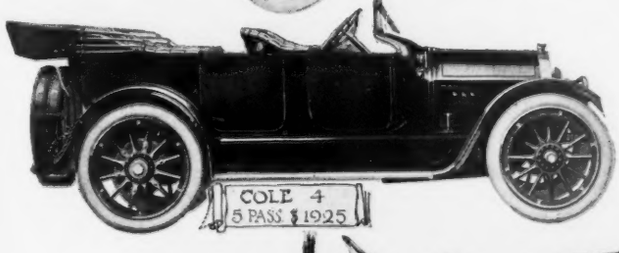


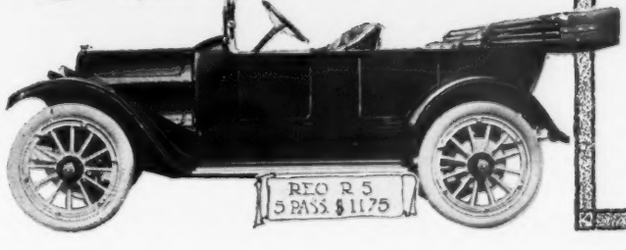








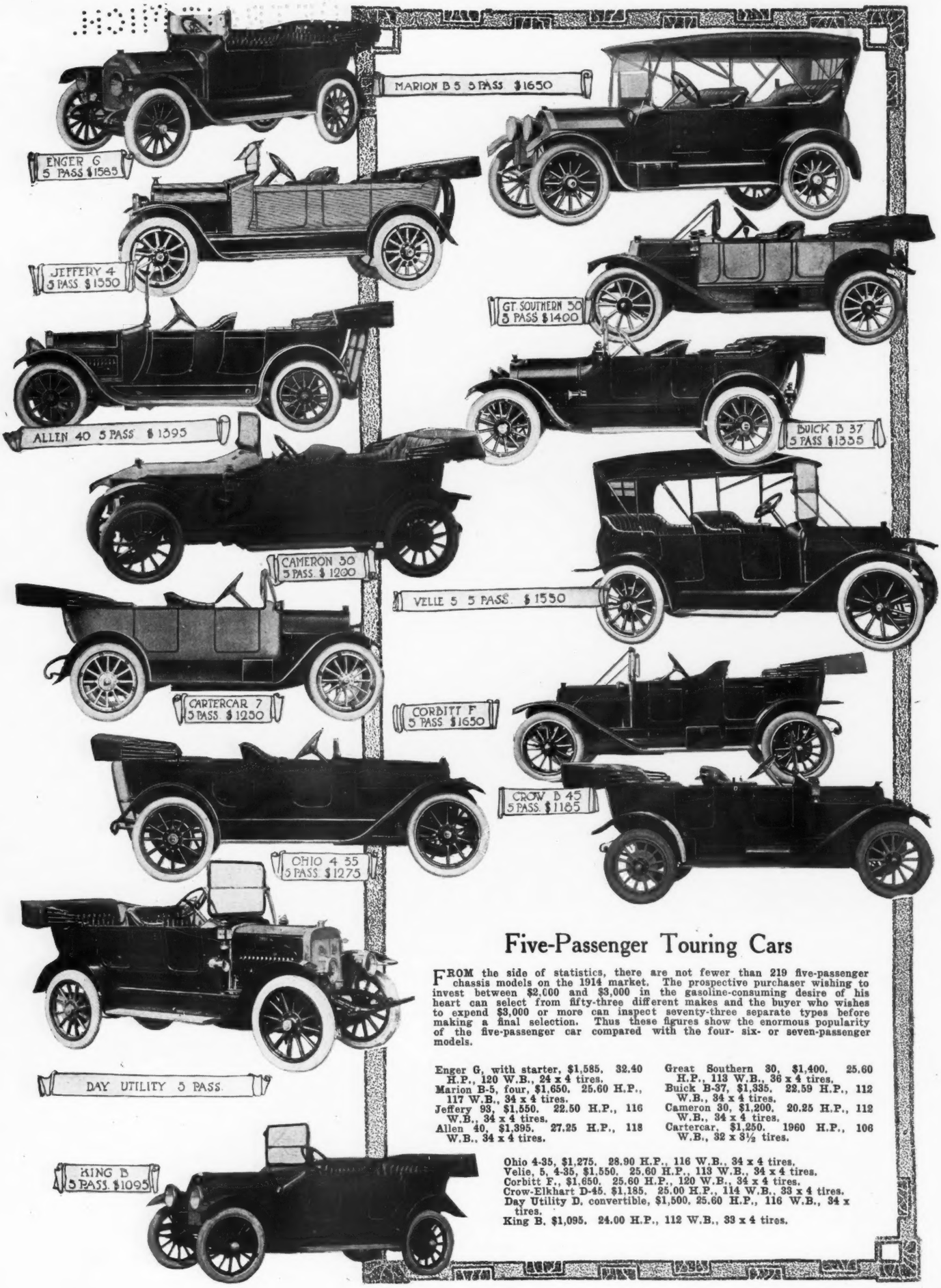




Details of Five-Passenger Tourists

TWO may be company and three may be a crowd according to the lovers' adage, but on a motoring party, five is evidently just the right number if the steady and unparalleled popularity of the five-passenger touring car is a dependable basis on which to make such a deduction. On the junk heap of time lies "the bicycle built for two" and where once it was supreme, now purrs the "motor car built for five." With its lines differing but slightly from those of the larger models and without the additional tonneau seats of the six and seven-passenger vehicles, the five-passenger model is the typical American type and the most commonly seen.

Locomobile 38 LD, four and five-passenger, $4,400. 43.80 H.P., 132 W.B., 36 x 5 tires.
Packard 2-38, phaeton, $3,750. 38.40 H.P., 140 W.B., 37 x 5 tires.
Mercer M-35, $3,000. 32.40 H.P., 124 W.B., 35 x 4½ tires.
Pullman, 6-46, four and five-passenger, $2,400. 38.75 H.P., 130 W.B., 36 x 4½ tires.
S. & M. 14-48, $2,500. 33.75 H.P., 130 W.B., 34 x 4½ tires.
Franklin 6-30, $2,300. 31.60 H.P., 120 W.B., 34 x 4½ tires.
Chadwick 19, five and seven-passenger, $5,500. 60.00 H.P., 133 W.B., 37 x 5 tires.
Peerless, 38-6, four and five-passenger torpedo, $4,300. 38.40 H.P., 135 W.B., 36 x 4½ tires.
Lozier 77, $3,250. 36.06 H.P., 127½ W.B., 36 x 4½ tires.
Winton 20, four and five-passenger, $3,250. 48.60 H.P., 130 W.B., 36 x 4½ tires.
Garford G-17, $2,750.
Selden 49, $2,500. 36.10 H.P., 125 W.B., 36 x 4 tires.
Speedwell Series B, $2,850. 40.90 H.P., 135 W.B., 37 x 5 tires.
Apperson Jackrabbit 6-55, $2,350. 43.80 H.P., 128 W.B., 37 x 4½ tires.
Palmer-Singer K Brighton Six, $2,295. 45.00 H.P., 128 W.B., 36 x 4½ tires.
DeSoto Six, $2,185. 38.40 H.P., 132 W.B., 36 x 4 tires.
Willys-Knight Four, sleeve valve motor.
Davis 6-50, $2,150. 33.75 H.P., 128 W.B., 37 x 4½ tires.
Cole 4, $1,925. 28.90 H.P., 120 W.B., 34 x 4½ tires.
Reo the Fifth R-5, $1,175. 25.60 H.P., 112 W.B., 34 x 4 tires.
Howard 6 Series D, $2,375. 40.90 H.P., 130 W.B., 36 x 4½ tires.
Henderson Six, $2,285. 33.75 H.P., 126 W.B., 35 x 4½ tires.
Pathfinder XIV-A, $2,185. 27.25 H.P., 120 W.B.
Imperial 44-6, $2,000. 33.76 H.P., 126 W.B., 36 x 4½ tires.
Jackson Majestic, $1,885. 32.40 H.P., 124 W.B., 36 x 4 tires.


MARION B 5 5 PASS $1650
ENGER G 5 PASS $1585
JEFFERY 4 5 PASS $1550
GT SOUTHERN 30 5 PASS $1400
ALLEN 40 5 PASS $1395
BUICK B 37 5 PASS $1335
CAMERON 30 5 PASS. $1200
VELIE 5 5 PASS. $1550
CARTERCAR 7 5 PASS $1250
CORBITT F 5 PASS $1650
CROW D 45 5 PASS. $1185
OHIO 4 35 5 PASS $1275
DAY UTILITY 5 PASS.
KING B 5 PASS. $1095

Five-Passenger Touring Cars

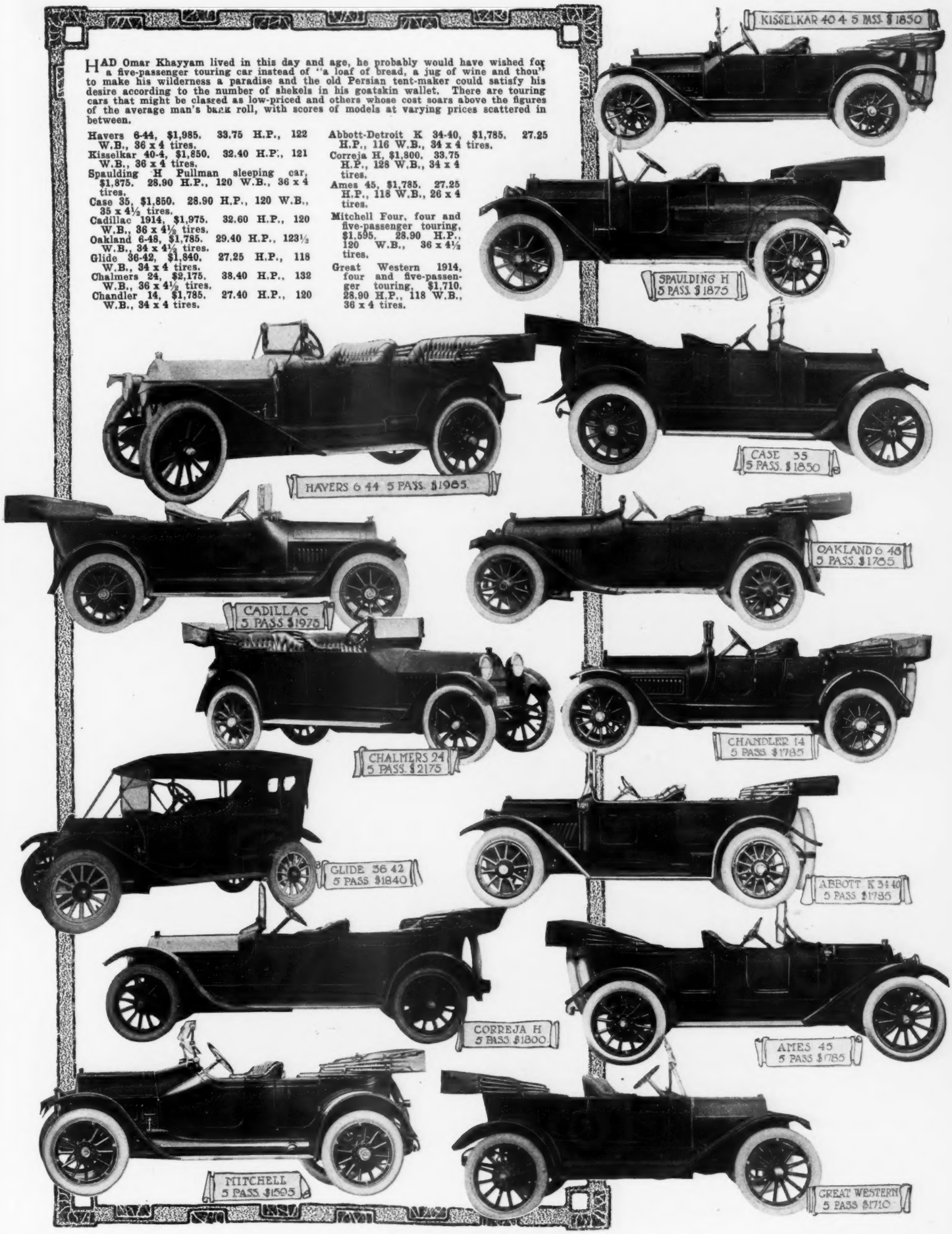
FROM the side of statistics, there are not fewer than 219 five-passenger chassis models on the 1914 market. The prospective purchaser wishing to invest between $2,000 and $3,000 in the gasoline-consuming desire of his heart can select from fifty-three different makes and the buyer who wishes to expend $3,000 or more can inspect seventy-three separate types before making a final selection. Thus these figures show the enormous popularity of the five-passenger car compared with the four- six- or seven-passenger models.

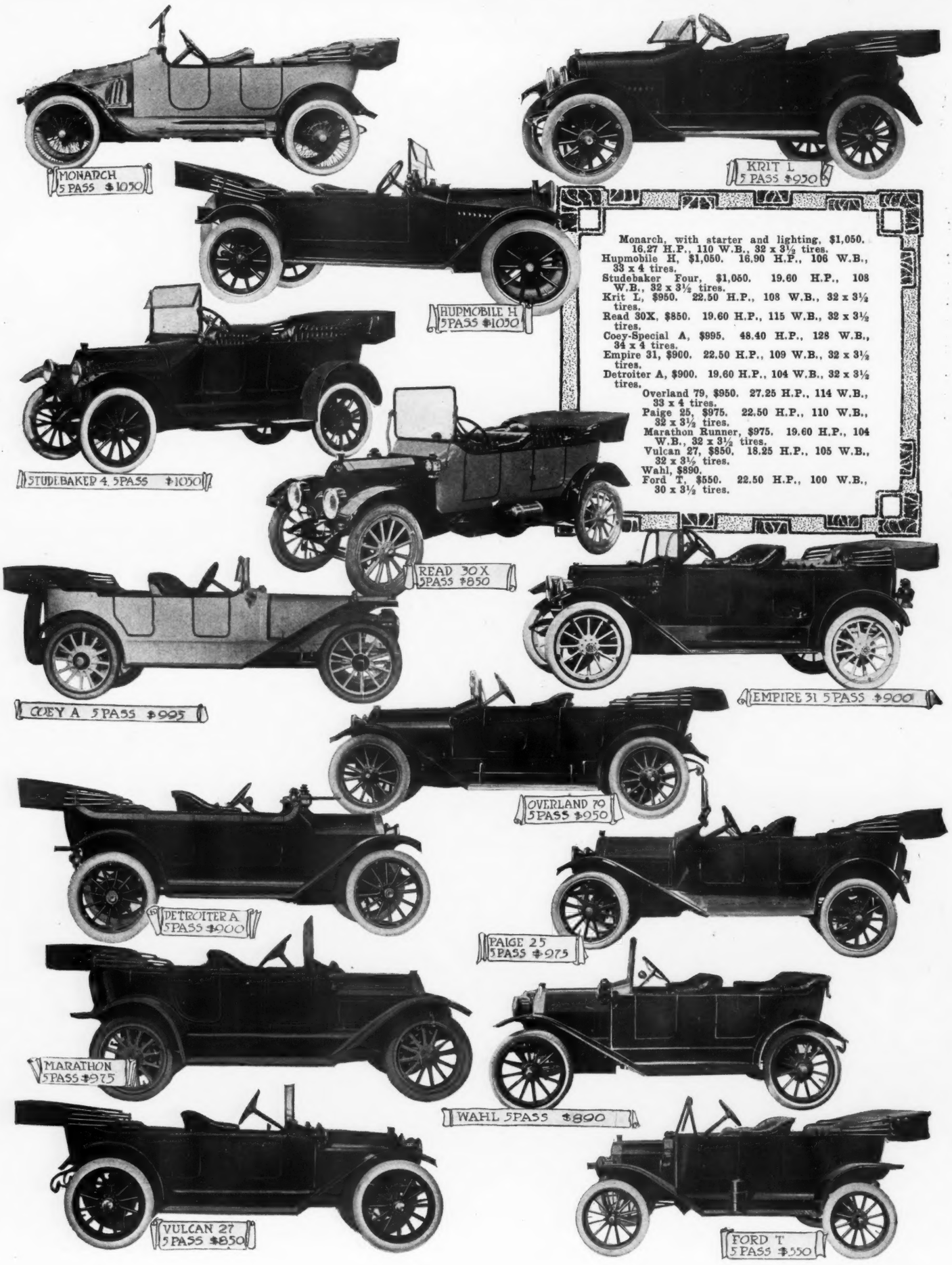
Enger G, with starter, $1,585. 32.40 H.P., 120 W.B., 24 x 4 tires.
Marion B-5, four, $1,650. 25.60 H.P., 117 W.B., 34 x 4 tires.
Jeffery 93, $1,550. 22.50 H.P., 116 W.B., 34 x 4 tires.
Allen 40, $1,395. 27.25 H.P., 118 W.B., 34 x 4 tires.
Great Southern 30, $1,400. 25.60 H.P., 113 W.B., 36 x 4 tires.
Buick B-37, $1,335. 22.59 H.P., 112 W.B., 34 x 4 tires.
Cameron 30, $1,200. 20.25 H.P., 112 W.B., 34 x 4 tires.
Cartercar, $1,250. 1960 H.P., 106 W.B., 32 x 3½ tires.

Ohio 4-35, $1,275. 28.90 H.P., 116 W.B., 34 x 4 tires.
Velie, 5, 4-35, $1,550. 25.60 H.P., 113 W.B., 34 x 4 tires.
Corbitt F., $1,650. 25.60 H.P., 120 W.B., 34 x 4 tires.
Crow-Elkhart D-45. $1,185. 25.00 H.P., 114 W.B., 33 x 4 tires.
Day Utility D. convertible, $1,500. 25.60 H.P., 116 W.B., 34 x tires.
King B. $1,095. 24.00 H.P., 112 W.B., 33 x 4 tires.

HAD Omar Khayyam lived in this day and age, he probably would have wished for a five-passenger touring car instead of "a loaf of bread, a jug of wine and thou" to make his wilderness a paradise and the old Persian tent-maker could satisfy his desire according to the number of shekels in his goatskin wallet. There are touring cars that might be classed as low-priced and others whose cost soars above the figures of the average man's bank roll, with scores of models at varying prices scattered in between.

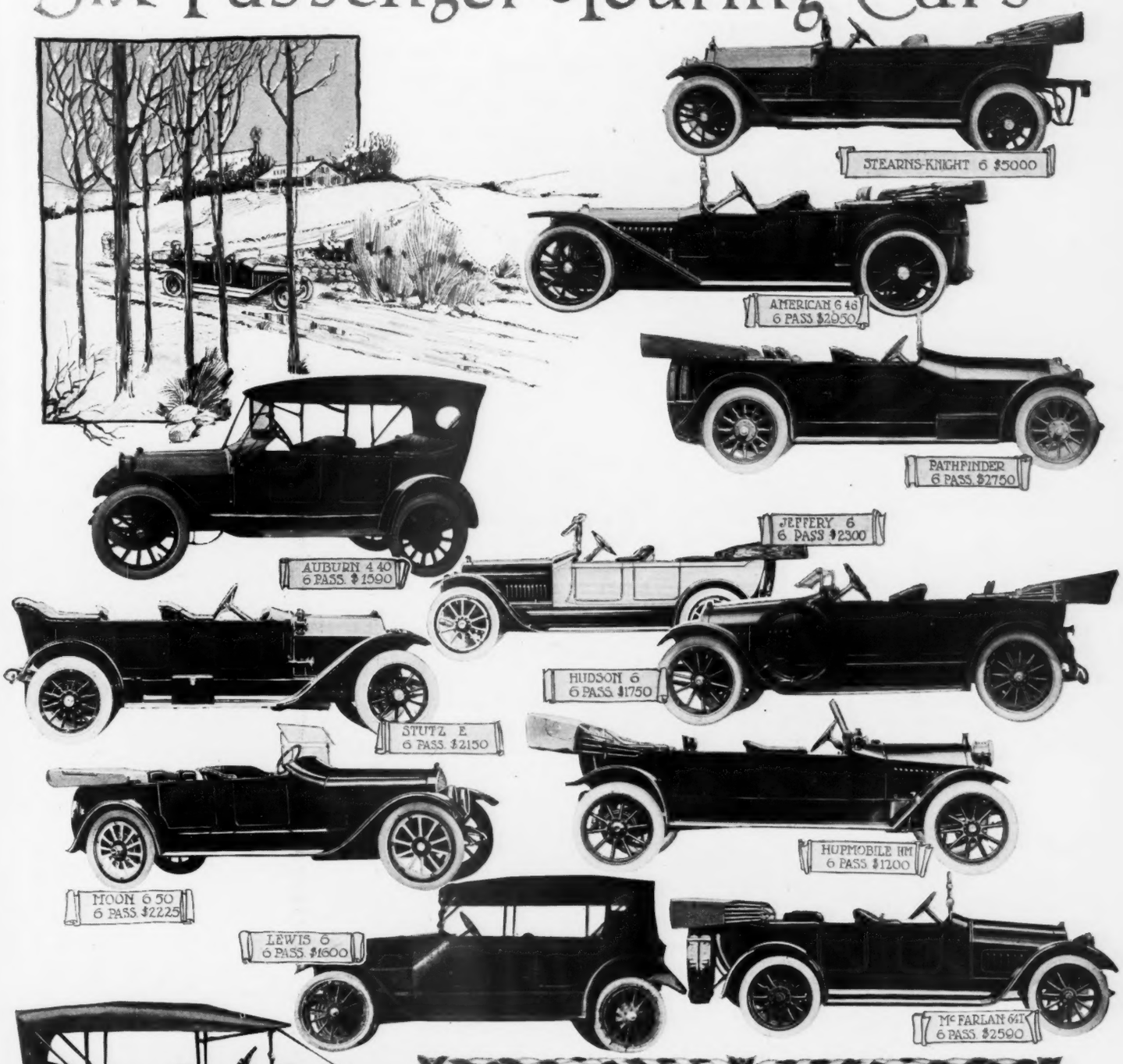
Havers 6-44, $1,985. 33.75 H.P., 122 W.B., 36 x 4 tires.
Kisselkar 40-4, $1,850. 32.40 H.P., 121 W.B., 36 x 4 tires.
Spaulding H Pullman sleeping car, $1,875. 28.90 H.P., 120 W.B., 36 x 4 tires.
Case 35, $1,850. 28.90 H.P., 120 W.B., 35 x 4½ tires.
Cadillac 1914, $1,975. 32.60 H.P., 120 W.B., 36 x 4½ tires.
Oakland 6-48, $1,785. 29.40 H.P., 123½ W.B., 34 x 4½ tires.
Glide 36-42, $1,840. 27.25 H.P., 118 W.B., 34 x 4 tires.
Chalmers 24, $2,175. 38.40 H.P., 132 W.B., 36 x 4½ tires.
Chandler 14, $1,785. 27.40 H.P., 120 W.B., 34 x 4 tires.
Abbott-Detroit K 34-40, $1,785. 27.25 H.P., 116 W.B., 34 x 4 tires.
Correja H, $1,800. 33.75 H.P., 128 W.B., 34 x 4 tires.
Ames 45, $1,785. 27.25 H.P., 118 W.B., 36 x 4 tires.
Mitchell Four, four and five-passenger touring, $1,595. 28.90 H.P., 120 W.B., 36 x 4½ tires.
Great Western 1914, four and five-passenger touring, $1,710. 28.90 H.P., 118 W.B., 36 x 4 tires.


KISSELKAR 40 4 5 PASS $1850
SPAULDING H 5 PASS $1875
CASE 35 5 PASS $1850
HAVERS 6 44 5 PASS $1985
OAKLAND 6 48 5 PASS $1785
CADILLAC 5 PASS $1976
CHANDLER 14 5 PASS $1785
CHALMERS 24 5 PASS $2175
GLIDE 36 42 5 PASS $1840
ABBOTT K 34 40 5 PASS $1785
CORREJA H 5 PASS $1800
AMES 45 5 PASS $1785
MITCHELL 5 PASS $1595
GREAT WESTERN 5 PASS $1710


MONARCH 5 PASS $1050
KRIT L 5 PASS $950
HUPMOBILE H 5 PASS $1050
STUDEBAKER 4 5 PASS $1050
READ 30X 5 PASS $850
COEY A 5 PASS $995
EMPIRE 31 5 PASS $900
OVERLAND 79 5 PASS $950
DETROITER A 5 PASS $900
PAIGE 25 5 PASS $975
MARATHON 5 PASS $975
WAHL 5 PASS $890
VULCAN 27 5 PASS $850
FORD T 5 PASS $550

Monarch, with starter and lighting, $1,050. 16.27 H.P., 110 W.B., 32 x 3½ tires.
Hupmobile H, $1,050. 16.90 H.P., 106 W.B., 33 x 4 tires.
Studebaker Four, $1,050. 19.60 H.P., 108 W.B., 32 x 3½ tires.
Krit L, $950. 22.50 H.P., 108 W.B., 32 x 3½ tires.
Read 30X, $850. 19.60 H.P., 115 W.B., 32 x 3½ tires.
Coey-Special A, $995. 48.40 H.P., 128 W.B., 34 x 4 tires.
Empire 31, $900. 22.50 H.P., 109 W.B., 32 x 3½ tires.
Detroiter A, $900. 19.60 H.P., 104 W.B., 32 x 3½ tires.
Overland 79, $950. 27.25 H.P., 114 W.B., 33 x 4 tires.
Paige 25, $975. 22.50 H.P., 110 W.B., 32 x 3½ tires.
Marathon Runner, $975. 19.60 H.P., 104 W.B., 32 x 3½ tires.
Vulcan 27, $850. 18.25 H.P., 105 W.B., 32 x 3½ tires.
Wahl, $890.
Ford T, $550. 22.50 H.P., 100 W.B., 30 x 3½ tires.

Six Passenger Touring Cars



Details of the Six-Passenger Tourists

Stutz Series 4-E, $2,150. 35.10 H.P., 130 W.B., 34 x 4½-inch tires.

Moon 6-50, four and six-passenger, $2,225. 33.75 H.P., 129 W.B., 35 x 4½-inch tires.

Auburn 4-40, $1,590. 32.40 H.P., 120 W.B., 36 x 4-inch tires.

Lewis Six, $1,600. 29.40 H.P., 135 W.B., 36 x 4-inch tires.

Stearns-Knight Six, six and seven-passenger, $5,000. 43.80 H.P., 140 W.B., 37 x 5-inch tires.

American 6-46, Underslung, $2,950.

Pathfinder, Leatherstocking, six and seven-passenger, $2,750. 40.90 H.P., 135 W.B., 35 x 5-inch tires.

Hudson Six, phaeton, $1,750. 29.40 H.P., 123 W.B., 34 x 4-inch tires.

Hupmobile H M, $1,200. 16.90 H.P., 106 W.B., 33 x 4-inch tires.

McFarlan six and seven-passenger, $2,590. 38.40 H.P., 128 W.B., 36 x 4½-inch tires.

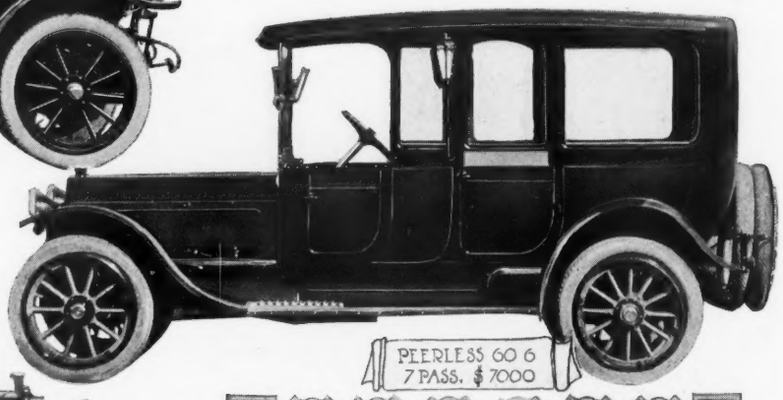
Partin-Palmer 38, $975. 115 W.B., 32 x 3½-inch tires.

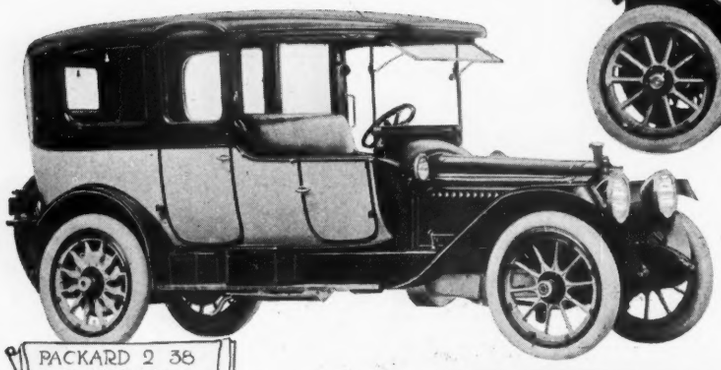
Vaughan, $2,750. 33.75 H.P., 138 W.B., 35 x 4½-inch tires.

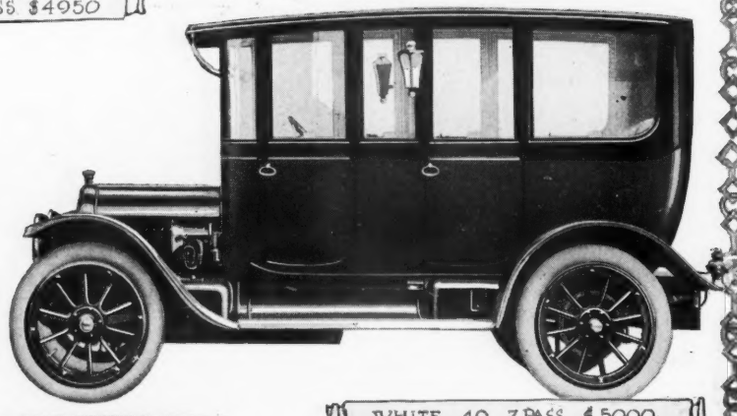
Jeffery six-cylinder, $2,300. 33.75 H.P., 128 W.B., 36 x 4½-inch tires.

In addition to these the following makes of six-passenger cars are not illustrated on these pages: Cadillac, Correja, Crow, Davis, Dorris, Havers, Herreshoff, Holly, Imperial, Lenox, Locomobile, Mondex-Magic, Norwalk, Packard, Rayfield, Winton.

Limousines and Landaulets Berlines and Sedans



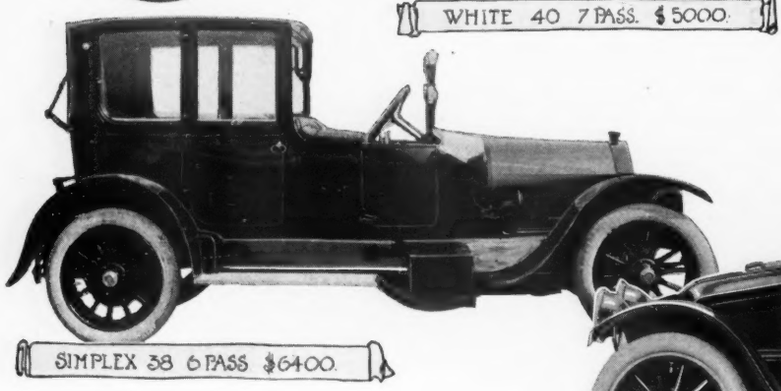


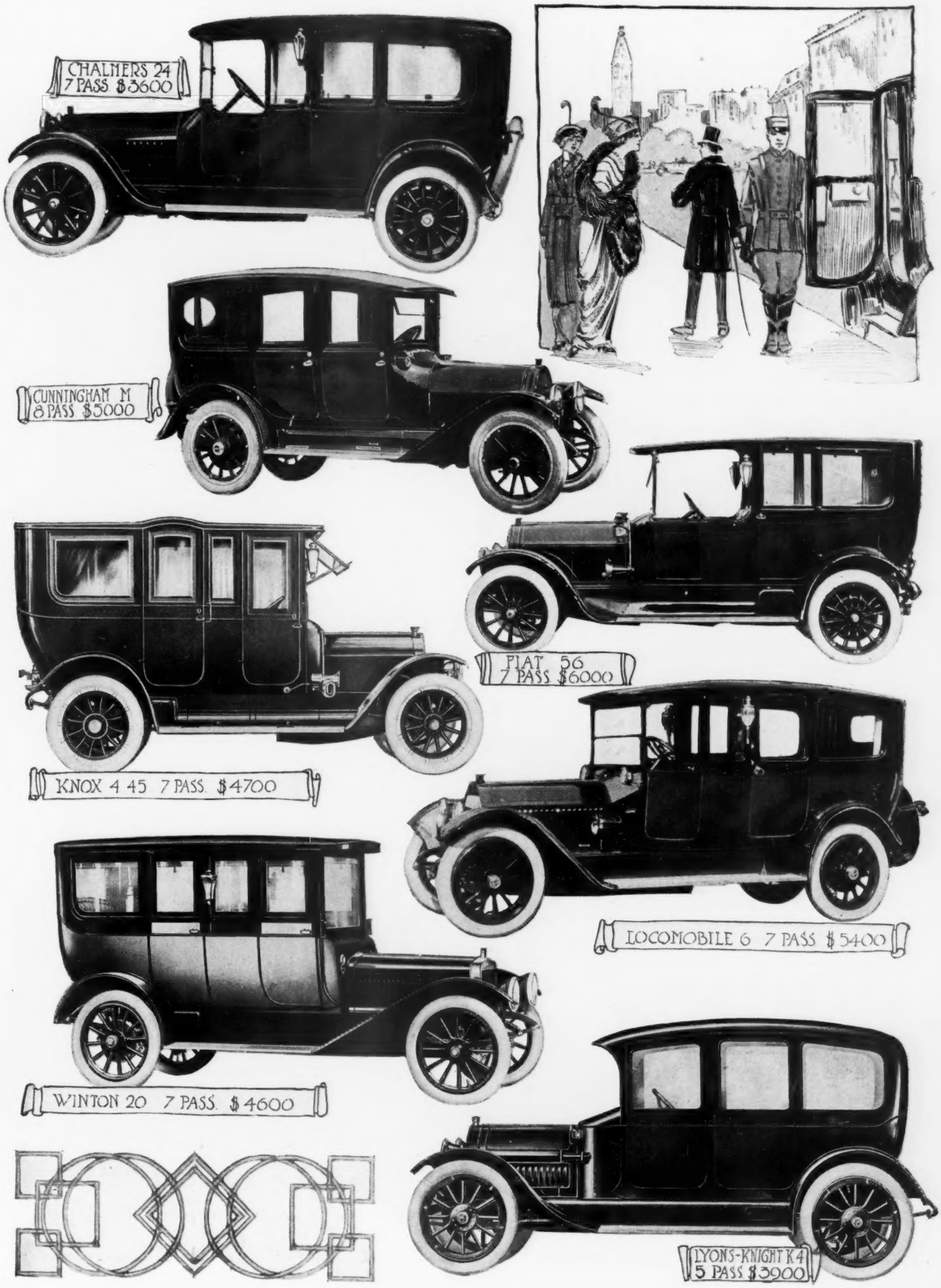


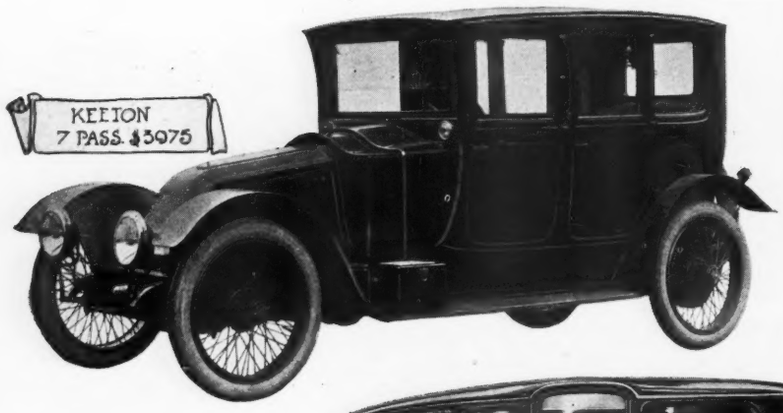
Inclosed Cars in Detail

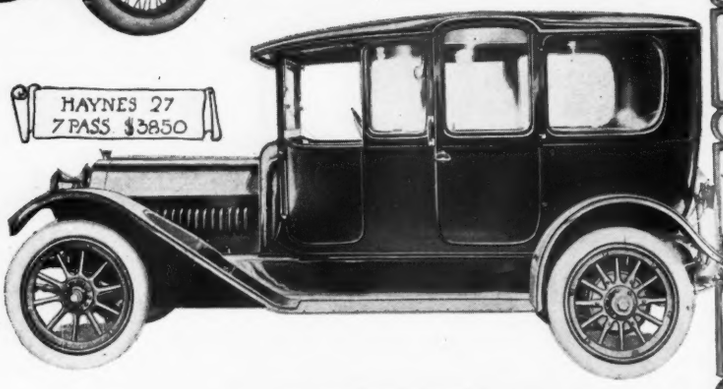
THAT there is a constantly increasing demand for the town car is evidenced by the fact that thirty-three makers, representing the majority of the high-priced American car builders, are manufacturing limousines for the present season.

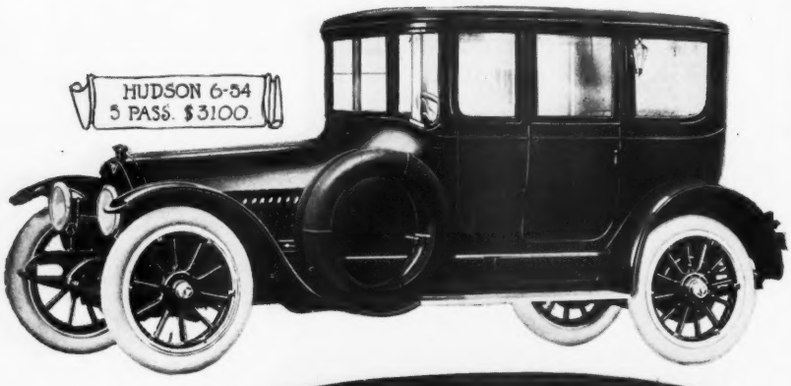
Pierce-Arrow 38-C2, five or seven-passenger brougham, $5,200. 38.40 H.P., optional W.B., 34 x 4½-inch tires.
Peerless 60-6, seven-passenger limousine, $7,000. 60.00 H.P., 140-inch W.B., 38 x 5½-inch tires.
Packard 2-38, seven-passenger limousine, $4,950. 38.40 H.P., 140-inch W.B., 37 x 5-inch tires.
White 40 G.E.B., seven-passenger limousine, $5,000. 28.90 H.P., 120-inch W.B., 36 x 4½-inch tires.
Simplex 38, six-passenger landaulet, $6,400. 38.00 H.P., 137-inch W.B., 35 x 5-inch tires.
Franklin 6-30, five-passenger berline, $3,400. 31.60 H.P., 120-inch W.B., 34 x 4½-inch tires.
Chalmers Six 24, seven-passenger limousine, $3,600. 38.40 H.P., 132-inch W.B., 36 x 4½-inch tires.
Cunningham M, eight-passenger berline, $5,000. 36.10 H.P., 124-inch W.B., 36 x 4½-inch tires.
Knox 45, seven-passenger limousine, $4,700. 40.00 H.P., 126-inch W.B., 37 x 5-inch tires.
Winton 20, fore-door, seven-passenger limousine, $4,600. 48.60 H.P., 130-inch W.B., 36 x 4½-inch tires.
Fiat 56, seven-passenger, $6,000. 45.00 H.P., 135-inch W.B., 37 x 5-inch tires.
Locomobile, Little Six, seven-passenger limousine, $5,400. 43.80 H.P., 132-inch W.B., 36 x 5-inch tires.
Lyons-Knight K-4, five-passenger sedan, $3,900. 32.40 H.P., 130-inch W.B., 36 x 5-inch tires.

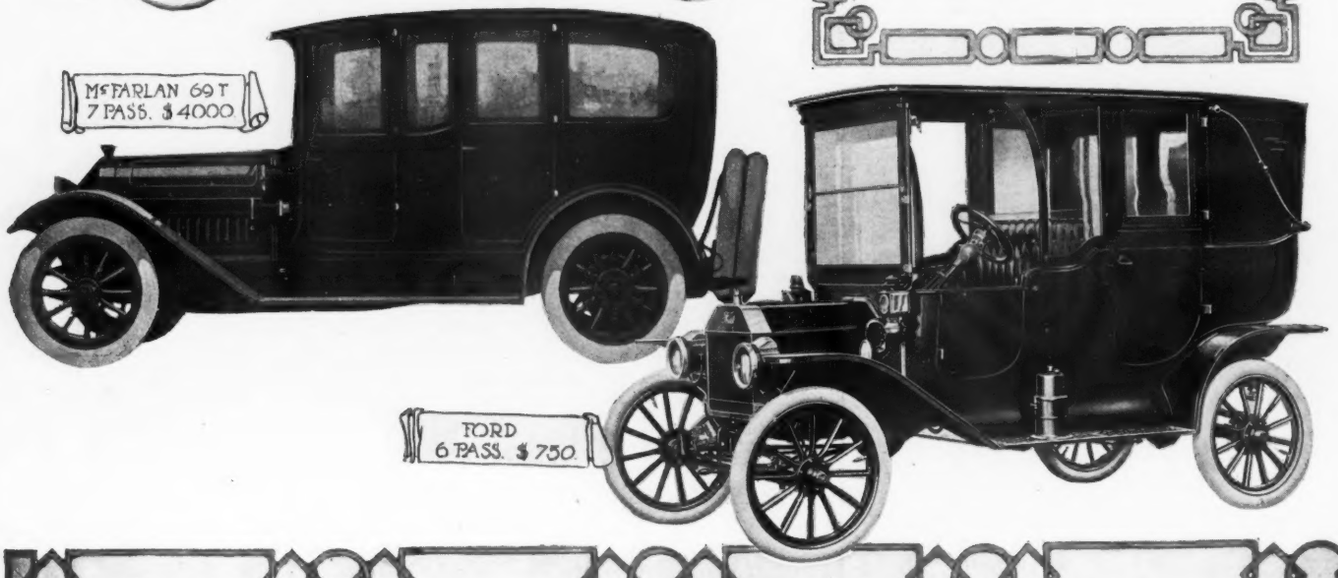



CHALMERS 24
7 PASS $3600
CUNNINGHAM M
8 PASS $5000
FIAT 56
7 PASS $6000
KNOX 4 45 7 PASS. $4700
LOCOMOBILE 6 7 PASS $5400
WINTON 20 7 PASS. $4600
LYONS-KNIGHT K4
5 PASS $3900









THE American who can afford a limousine evidently is developing aesthetically and demanding more grace and beauty in the car that he buys. The designer is ready to meet such a demand at any rate, and as a result the town car of 1914, although not as princely an equipage as the models shown at the Paris and Olympia shows, is an improvement over its predecessors. The pronounced roof curve of a year ago is disappearing in favor of the softly rounded style of top. More makers are arching their doors into the roof than was the case in 1913. Window spaces are generally larger and the sashless type of window is gaining in popularity. More attention has been paid to the interior fittings. Wire wheels on the town car are coming into favor and as soon as the manufacturers can secure them in large quantities, more limousines will be equipped with them. More berline and sedan types are being produced. The sedan, usually a single-compartment vehicle, appeals especially to the resident of a large city who drives his own car and uses it winter and summer to convey him to and from his home and place of business.

Keeton, seven-passenger, $3,975. 33.75 H.P., 136-inch W.B., 34 x 4½-inch tires.

Haynes 27, seven-passenger limousine, $3,850. 43.80 H.P., 136-inch W.B., 36 x 4½-inch tires.

Hudson 6-54, five-passenger sedan, $3,100. 40.90 H.P., 135-inch W.B., 36 x 4½-inch tires.

McFarlan 69 T, seven-passenger limousine. $4,000. 38.40 H.P., 128-inch W.B., 36 x 4½-inch tires.

Ford, six-passenger town car, $750. 22.50 H.P., 100-inch W.B., 30 x 3½-inch tires.

Cadillac, inside-drive, five-passenger limousine, $2,800. 32.60 H.P., 120-inch W.B., 36 x 4½-inch tires.

Apperson 4-45, five-passenger sedan, $2,500. 32.40 H.P., 120-inch W.B., 36 x 4-inch tires.

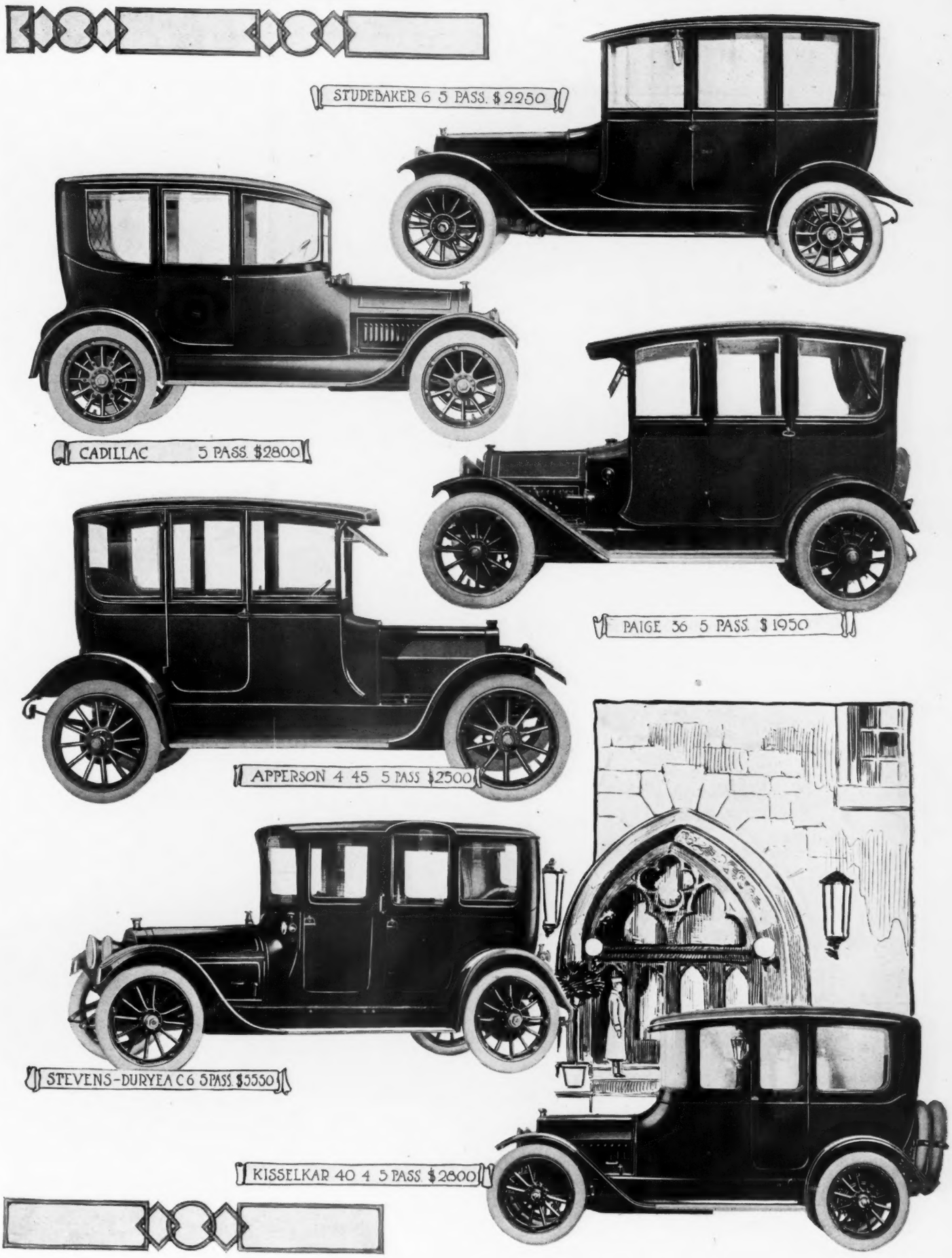
Stevens-Duryea C 6, five-passenger, demi-berline, $5,550.

Studebaker Six, five-passenger sedan, $2,250. 29.40 H.P., 121-inch W.B., 34 x 4-inch tires.

Paige 36, five-passenger sedan, $1,950. 25.60 H.P., 116-inch W.B., 34 x 4-inch tires.

Kisselkar 40-4, five-passenger coupé, $2,500-$2,800. 32.40 H.P., 121-inch W.B., 34 x 4-inch tires.

In addition to these the following inclosed cars other than coupés are not illustrated on these pages: Cartercar sedan, Jeffery sedan and limousine, Marion sedan, Abbott-Detroit limousine, Austin limousine, Chadwick limousine, Cole limousine, Dorris limousine, Firestone-Columbus limousine, Franklin sedan and limousine, Great Eagle limousine, Lozier limousine, Marmon limousine and landaulets, National limousine, Norwalk limousine, S. G. V. limousine, landaulet and brougham, Stearns-Knight limousine, landaulet and sedan.


STUDEBAKER 6 5 PASS. $2250
CADILLAC 5 PASS. $2800
PAIGE 36 5 PASS. $1950
APPERSON 4 45 5 PASS $2500
STEVENS-DURYEA C 6 5PASS $5550
KISSELKAR 40 4 5 PASS $2600

Runabouts, Roadsters and Speedsters

KLINE 6 60 2 PASS. $3500

STEARNS-KNIGHT 6
2 PASS. $4850

PAIGE 36
2 PASS. $1270

FRANKLIN 6 30
2 PASS. $2300

KISSELKAR 40 4
2 PASS. $1850

HUDSON 6 40
2 PASS $1750

KEETON
2 PASS. $3250

KING B
2 PASS. $1095

OVERLAND
2 PASS. $950

GT. SOUTHERN 50
2 PASS. $1750

HUPMOBILE M R
2 PASS. $1050

DETROITER A
2 PASS. $900

GRANT
2 PASS. $495

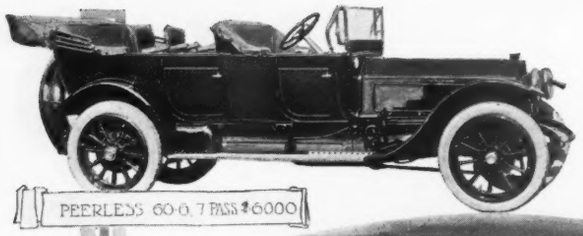
ALLEN 38
2 PASS. $1395

FORD T
2 PASS. $500

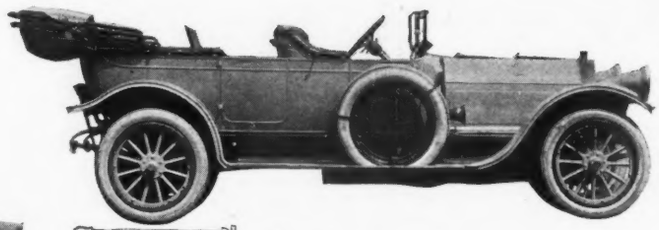
PACKARD 738 2 PASS. $3750
PIERCE-ARROW 38 2 PASS. $4500
STUTZ 4 2 PASS. $2000
REGAL N 2 PASS. $1125
MOON 42 2 PASS. $1750
ENGER C 2 PASS. $1285
VULCAN 27 2 PASS. $750
BUICK B 36 2 PASS. $1235
CHEVROLET H2 2 PASS. $750
REO 2 PASS. $1175
PATERSON 2 PASS. $1200
AMERICAN 6 42 2 PASS. $2750
HERRESHOFF 6 2 PASS. $1850
MERCER 35 2 PASS. $2900
METZ STANDARD 2 PASS. $475
DURYEA 2 PASS. $450

Klinekar 6-60, detachable-coupé roadster, $3,500. 44.68 H.P., 133-inch W.B., 37 x 5 tires.
Stearns-Knight, $4,850. 43.80 H.P., 134-inch W.B., 34 x 4-inch tires.
Paige, 36, $1,275. 25.60 H.P., 116-inch W.B.
Franklin 6-30, $2,300. 31.60 H.P., 120-inch W.B., 34 x 4½-inch tires.
Hudson 6-40, $1,750. 29.40 H.P., 123-inch W.B., 34 x 4-inch tires.
Keeton, $3,250. 33.75 H.P., 136-inch W.B.
Great Southern 50, $1,750. 43.03 H.P., 128-inch W.B., 36 x 4½-inch tires.
Hupmobile HR, $1,050. 16.90 H.P., 106-inch W.B., 33 x 4-inch tires.
Grant, $495. 12.10 H.P., 90-inch W.B.
Allen 38, $1,395. 27.25 H.P., 118-inch W.B., 34 x 4-inch tires.
Kisselkar 40-4, $1,850. 22.50 H.P., 121-inch W.B., 36 x 4-inch tires.
King B, $1,095, 24.00 H.P., 112-inch W.B.
Overland, $950. 27.25 H.P., 114-inch W.B.
Detroiter A 3 & A 4, $900. 19.60 H.P., 104-inch W.B., 32 x 3½-inch tires.
Ford T, $500. 22.50 H.P., 100-inch W.B.
Stutz Series E, Bearcat, four-cylinder, $2,000. 36.10 H.P., 120 W.B., 36 x 4½-inch tires; six-cylinder, $2,250. 38.40 H.P., 120 W.B.
Moon 42, $1,750. 32.40 H.P., 118 W.B.
Enger C, $1,285. 32.40 H.P., 120 W.B.
Regal H, $1,125. 22.50 H.P., 109 W.B.
Buick B 36, $1,235. 22.50 H.P., 112 W.B.
Chevrolet Royal Mail H-2, $750. 21.38 H.P., 104 W.B., 30 x 3½ tires.
Paterson 33, $1,200. 19.60 H.P., 112 W.B.
Reo the Fifth S T 5, $1,175. 25.60 H.P., 112 W.B., 34 x 4 tires.
Herreshoff 6-40, $1,850. 27.25 H.P., 124 W.B.
Metz, $475. 22.50 H.P., 90 W.B., 30 x 3 tires.
Duryea Buggyaut, $450. 86 W.B., 44 x 1⅜ tires.
American 6-42, $2,750. 43.80 H.P., 140 W.B.
Mercer Series O, Type 35, $2,900. 32.40 H.P., 144 W.B., 37 x 5 tires.
Packard 38 Phaeton runabout, $3,750.
Pierce-Arrow 38 C-2, $4,300. 38.40 H.P., optional W.B., 36 x 4½ tires.
Vulcan 27, $750. 18.25 H.P., 105 W.B.

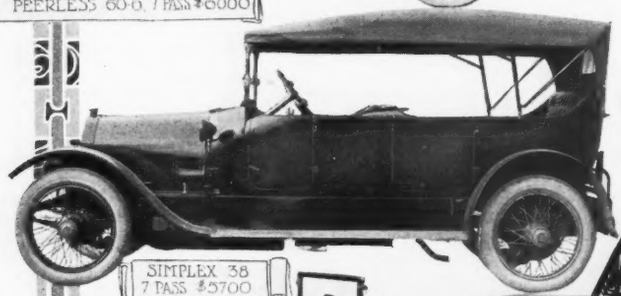
Seven Passenger



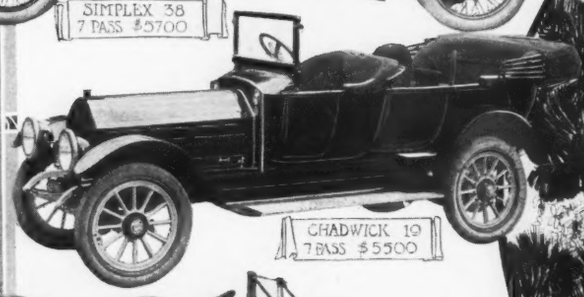
PEERLESS 60-6, 7 PASS. $6000



PIERCE-ARROW 66 A 2 7 PASS. $6000

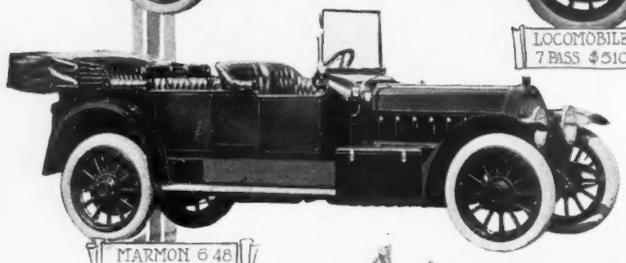


SIMPLEX 38 7 PASS. $5700

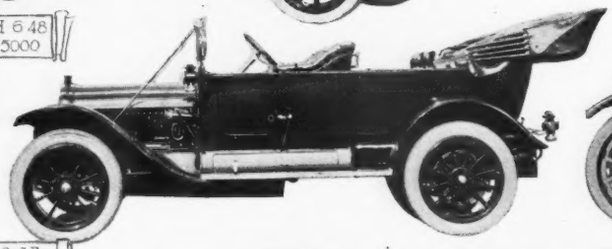


CHADWICK 10 7 PASS. $5500

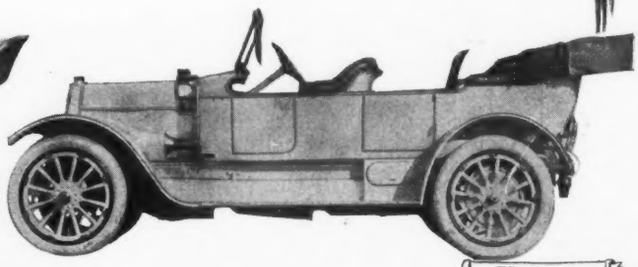
LOCOMOBILE 48 7 PASS. $5100



MARMON 6-48 7 PASS. $5000

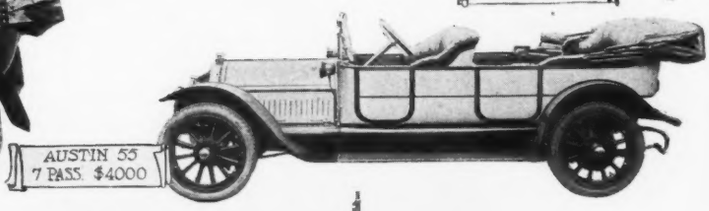


WHITE 6 GF 7 PASS. $5000

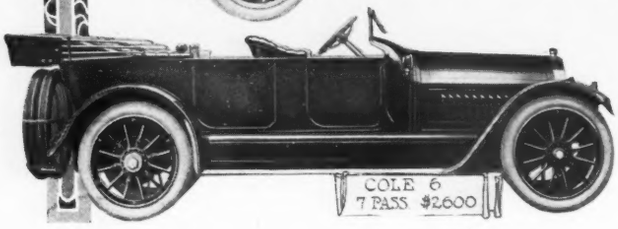


FIAT 55 7 PASS. $4500

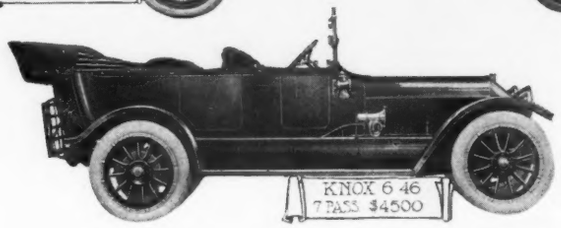
CUNNINGHAM M 7 PASS. $5750



AUSTIN 55 7 PASS. $4000



COLE 6 7 PASS. $2600

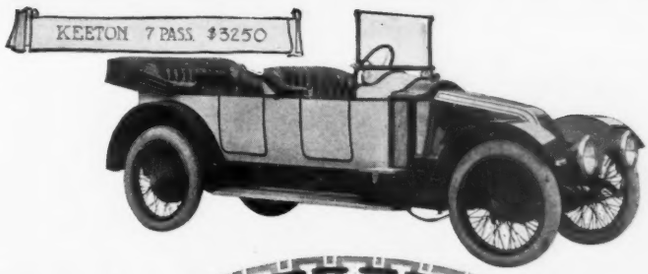


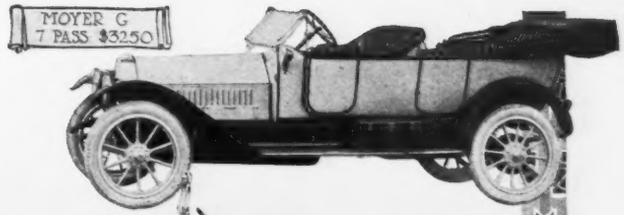
KNOX 6-46 7 PASS. $4500

For the lovers of the big roomy seven-passenger touring car a wide choice will be found. These cars are all substantial models, built to stand the wear and tear of the roads and are marvels of reliability.

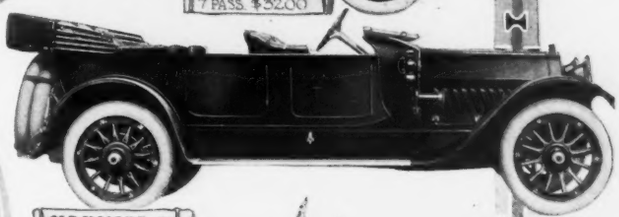
Touring Cars

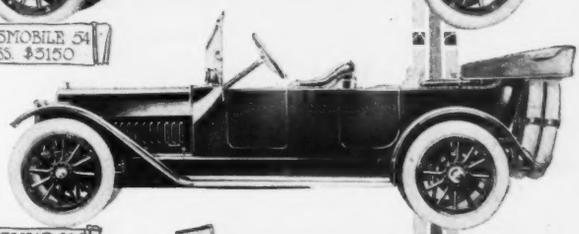
Knox Little Six, 46, six and seven-passenger torpedo, $4,500. 45.95 H.P., 134 W.B., 38 x 5 tires.
Keeton, $3,250. 33.75 H.P., 136 W.B., 36 x 4½ tires.
Westcott, six-cylinder, $2,535.
Pilot 60, six and seven-passenger, $2,785. 38.40 H.P., 132 W.B., 37 x 4½ tires.
Republic Series E, five and seven-passenger, $2,950. 43.80 H.P., 133 W.B., 36 x 4½ tires.
Speedwell Series H, $2,950. 40.90 H.P., 135 W.B., 37 x 5 tires.
Havers 6-60, five-passenger, $2,485. 40.90 H.P., 128 W.B., 36 x 4½ tires.
Moyer G, $3,250. 48.60 H.P., 135 W.B., 35 x 4½ tires.
Lyons-Knight K6, $3,200.
Oldsmobile 54, $3,150. 43.80 H.P., 139 W.B., 36 x 5 tires.
Kisselkar 60-6, $3,150. 48.60 H.P., 142 W.B., 37 x 5 tires.
Klinekar 6-60, four, six and seven-passenger touring, $2,985. 44.88 H.P., 133 W.B., 37 x 5 tires.
Dorris I, $2,550. 30.63 H.P., 121 W.B. 36 x 4½ tires.
Case 40, $2,300. 32.40 H.P., 124 W.B., 37 x 4½ tires.
Fiat 55, five and seven-passenger, $4,500. 42.00 H.P., 128 W.B., 37 x 5½ tires.
Pierce-Arrow 66 A-2, $6,000. 60.00 H.P., optional W.B., 38 x 5½ tires.
Peerless 60-6, six and seven-passenger, $6,000. 60.00 H.P., 140 W.B., 38 x 5½ tires.
Simplex 38, $5,700. 38.00 H.P., 138 W.B., 35 x 5 tires.
Chadwick 19, five and seven-passenger, $5,500. 60.00 H.P., 133 W.B., 37 x 5 tires.
Locomobile 48 LD, left drive, six and seven-passenger, $5,100. 48.60 H.P., 140 W.B., 37 x 5½ tires.
Marmon six 48, four, five and seven-passenger, $5,000. 48.60 H.P., 145 W.B., 37 x 5 tires.
White Six G F, five and seven-passenger, $5,000. 43.80 H.P., 132 W.B., 37 x 5 tires.
Cunningham M, $3,750. 36.10 H.P., 124 W.B., 36 x 4½ tires.
Cole Six, six and seven-passenger, $2,600. 43.80 H.P., 136 W.B., 36 x 4½ tires.
Austin 55, five and seven-passenger, $4,000. 38.40 H.P., 141½ W.B., 37 x 5 tires.

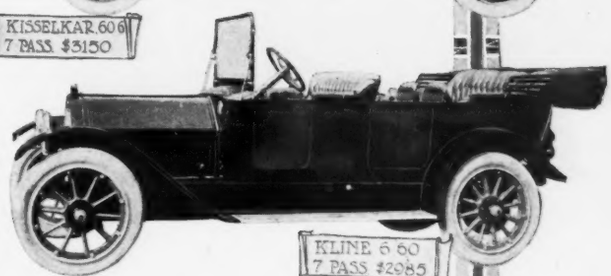

KEETON 7 PASS. $3250


MOYER G 7 PASS. $3250

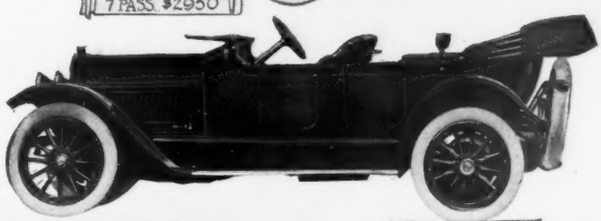
LYONS-ATLAS, K6 7 PASS. $3200

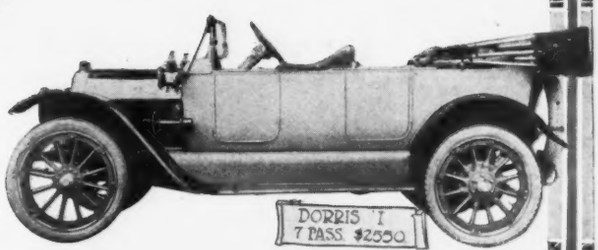

OLDSMOBILE 54 7 PASS. $3150


KISSELKAR 60 6 7 PASS. $3150


KLINE 6 60 7 PASS. $2985

REPUBLIC E 7 PASS. $2950


SPEEDWELL C 7 PASS. $2950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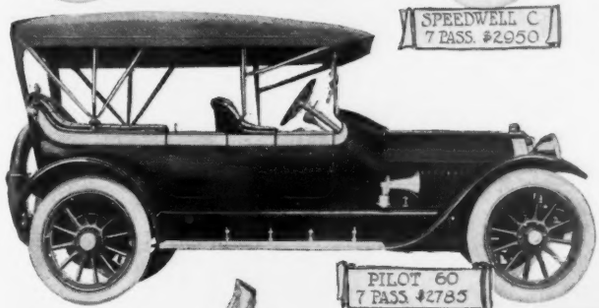
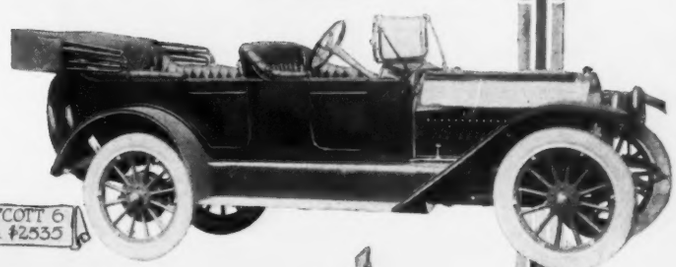

PILOT 60 7 PASS. $2785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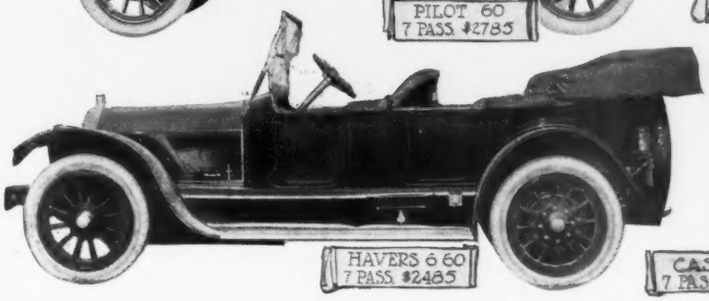
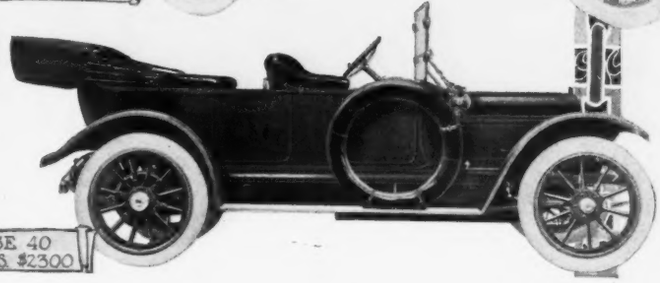

HAVERS 6 60 7 PASS. $2485

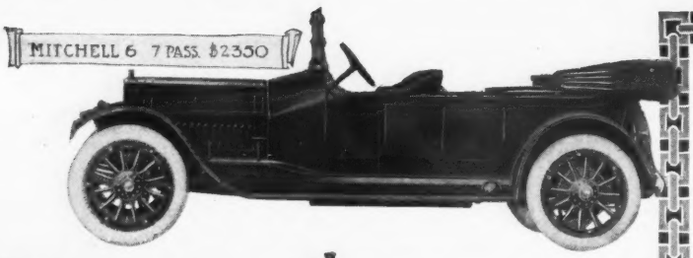

CASE 40 7 PASS. $2300

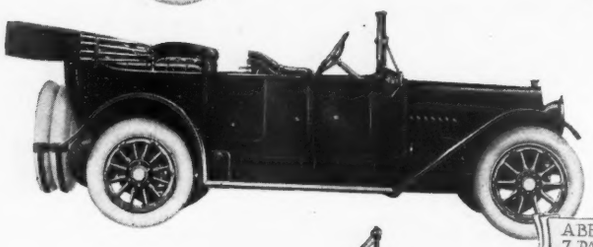
Details of Seven-Passenger Tourists

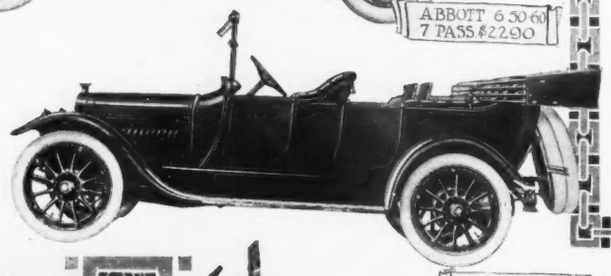
AS the Roman learned from the Greek, so the American car manufacturer has learned from the European designer certain lessons in beauty and grace. The touring cars of 1914 embody refinements that the models of 1913 lacked. The most important change in design is the transition between hood and body, the abrupt break at the dash having been eliminated by the cowl which is a continuation of the hood and extending back,, makes possible the streamline body effect. To accentuate the streamline effect, so popular across the Atlantic, many makers have discarded the auxiliary side lamps.

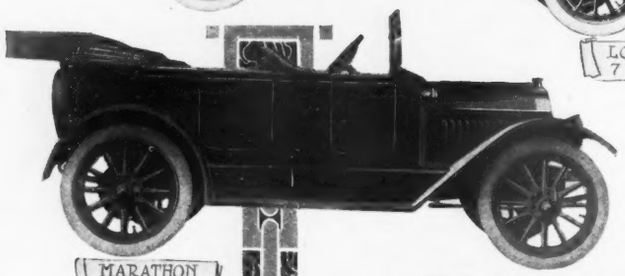
Mitchell Big Six, $2,350. 43.80 H.P., 144 W.B., 37 x 5 tires.
Abbott-Detroit, Belle Isle, $2,290. 33.75 H.P., 130 W.B., 35 x 4½ tires.
Lozier 4, Type 34, $2,100. 28.9 H.P., 120 W.B., 36 x 4½ tires.
Marathon Champion, $1,495. 32.60 H.P., 126 W.B., 36 x 4 tires.
Luverne 7-60, $2,500. 38.60 H.P., 128 W.B., 37 x 5 tires.
Hudson Six-54, phaeton, $2,250. 40.90 H.P., 135 W.B., 36 x 4½ tires.
Cadillac 1914, $2,075. 32.60 H.P., 120 W.B., 36 x 4½ tires.
Herreshoff 6-40, $1,900. 27.25 H.P., 124 W.B., 34 x 4 tires.
Studebaker Six, $1,575. 29.40 H.P., 121 W.B., 34 x 4 tires.
Jackson Sultanic, $2,300. 40.90 H.P., 138 W.B., 36 x 4½ tires.
Pratt 50-D, $2,300. 32.40 H.P., 122 W.B., 36 x 4 tires.
Buick B-55, $1,985. 33.75 H.P., 130 W.B., 36 x 4½ tires.
Haynes 27, six and seven-passenger, $2,785. 43.80 H.P., 136 W.B., 36 x 4½ tires.

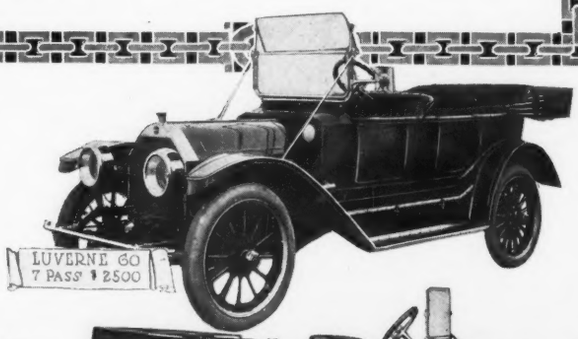
In addition to these the following makes of seven-passenger cars are not illustrated on these pages: Colby, Firestone-Columbus, Holly, Morse, Packard, Pathfinder, Premier, Pullman, S. & M. Spoerer, Staver, Stearns, Winton.

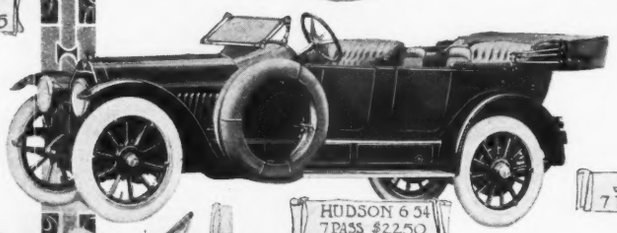

MITCHELL 6 7 PASS. $2350

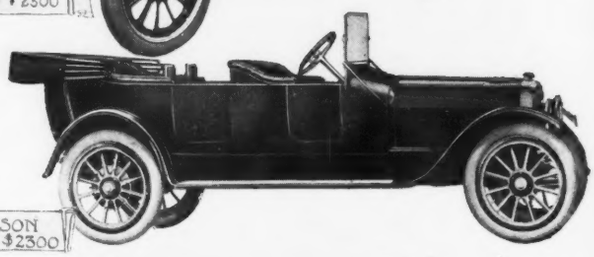

ABBOTT 6 50-60 7 PASS. $2290

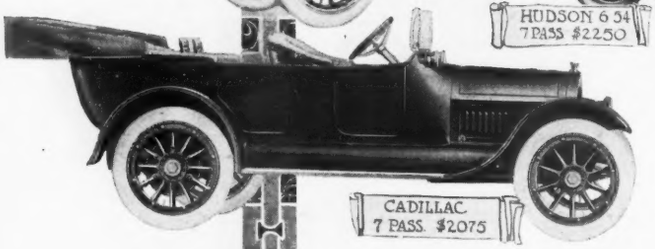

LOZIER 34 7 PASS. $2100

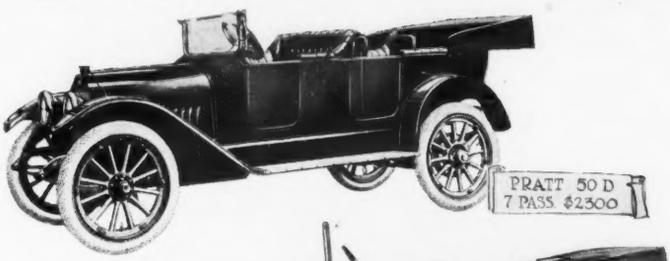

MARATHON 7 PASS. $1495

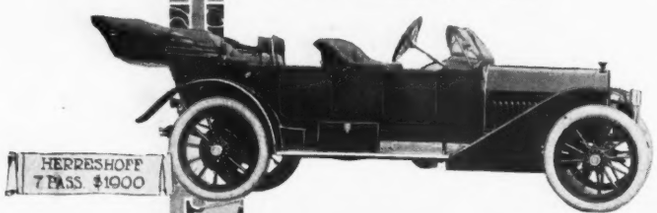

LUVERNE 60 7 PASS. $2500

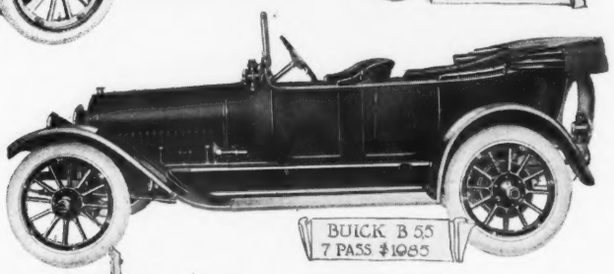

HUDSON 6 54 7 PASS. $2250

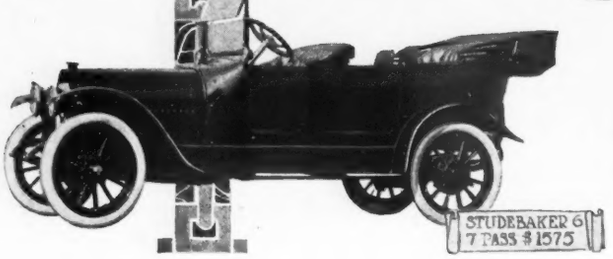

JACKSON 7 PASS. $2300

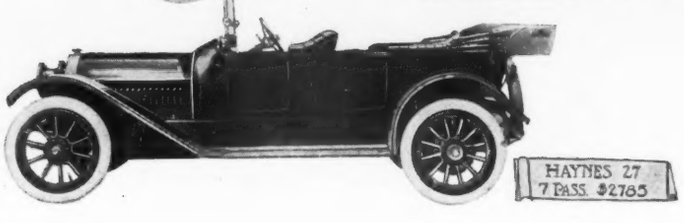

CADILLAC 7 PASS. $2075


PRATT 50 D 7 PASS. $2300

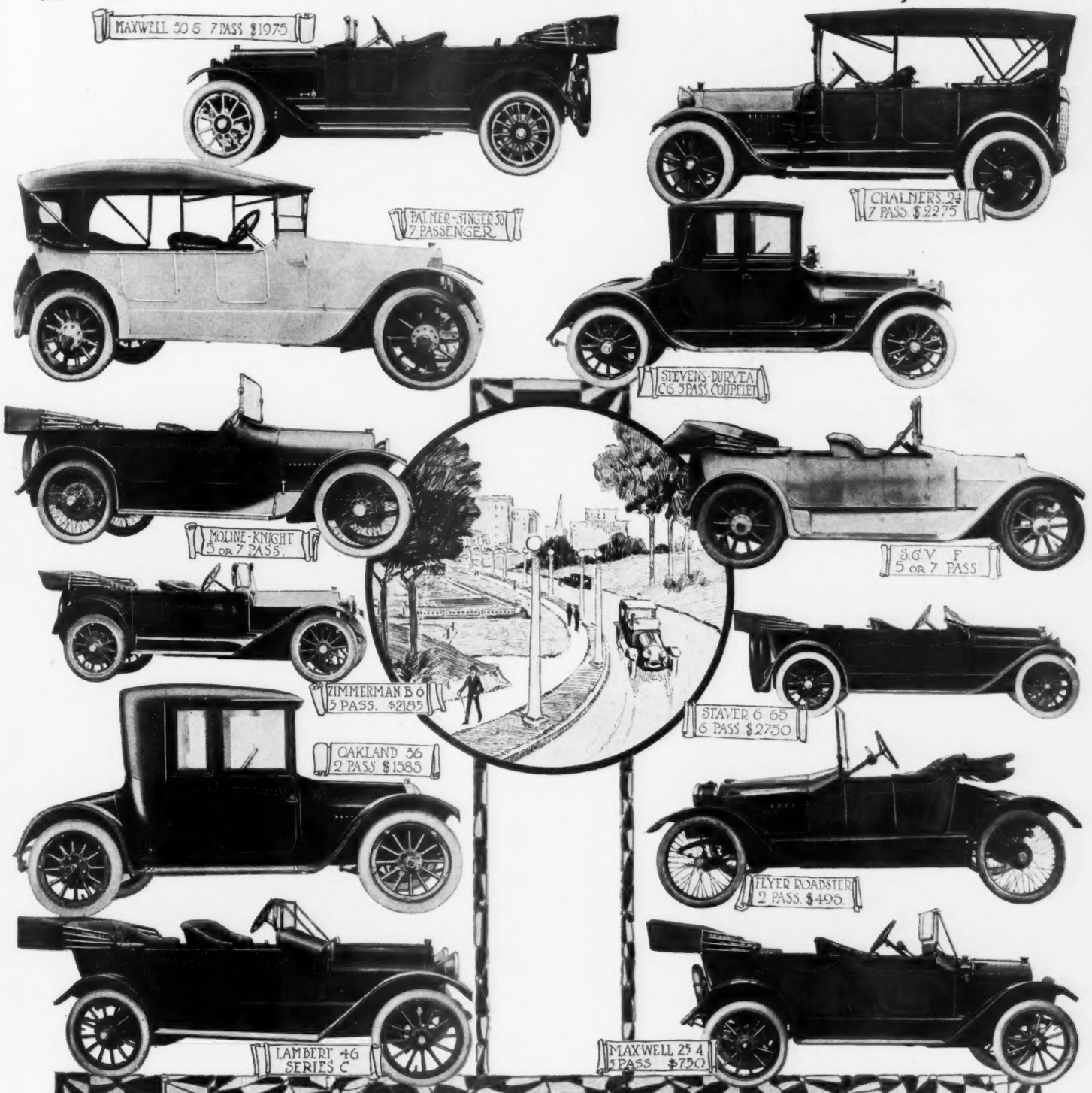

HERRESHOFF 7 PASS. $1900


BUICK B 55 7 PASS. $1985


STUDEBAKER 6 7 PASS. $1575


HAYNES 27 7 PASS. $2785

Miscellaneous Car Types


MAXWELL 50 6 7 PASS $1975
CHALMERS 24 7 PASS. $2275
PALMER-SINGER 50 7 PASSENGER
STEVENS-DURYEA C-6 5 PASS COUPELET
MOLINE-KNIGHT 5 OR 7 PASS.
S.G.V. F 5 OR 7 PASS
ZIMMERMAN B 6 5 PASS. $2185
STAVER 6 65 6 PASS $2750
OAKLAND 36 2 PASS $1585
FLYER ROADSTER 2 PASS. $495
LAMBERT 46 SERIES C
MAXWELL 25 4 5 PASS $750

Cars of Various Styles

ON this page are illustrated several types of touring cars, photograph of which were received too late to be classified in the regular departments. The use of wire wheels is not so prominent in this illustrated review as might have been expected. The review of 1915 probably will show more cars equipped with this type of wheel. The lack of manufacturing facilities has hampered their adoption.

Maxwell 50-6, seven-passenger touring, $1,975. 40.90 H.P., 130 W.B., 36 x 4½ tires.

Palmer-Singer 50, five or seven-passenger touring, $2,495. 38.40 H.P., 134 W.B., 36 x 4½ tires.

Moline-Knight, five or seven-passenger touring, $2,400. 25.60 H.P., 128 W.B., 36 x 4½ tires.

Stevens-Duryea, C-6, three-passenger coupelet. S.G.V., four or five-passenger touring, $3,500. 22.50 H.P., 120 W.B., 35 x 4½ tires.

Staver 6-65, six-passenger touring, $2,750. 38.40 H.P., 138 W.B., 37 x 4½ tires.

Flyer A, two-passenger roadster, $495. 12.10 H.P., 100 W.B., 28 x 3 tires.

Maxwell 25-4, five-passenger touring, $750. 20.03 H.P., 103 W.B., 30 x 3½ tires.

Zimmerman B-6, five-passenger touring, $2,185. 38.40 H.P., 120 W.B., 36 x 4 tires.

Oakland 36 Cabriolet, two-passenger, $1,585. 29.40 H.P., 123½ W.B., 35 x 4½ tires.

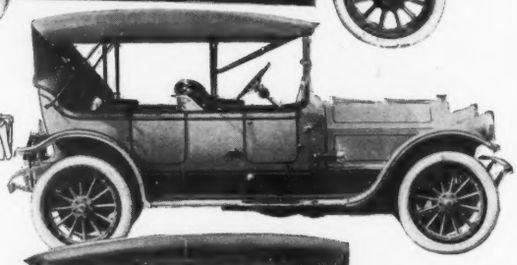
Lambert 46, Series C, four-passenger touring, $1,200. 22.50 H.P., 112 W.B., 32 x 3½ tires.

Chalmers 24, six-passenger, $2,275. 132 W.B., 36 x 4½ tires.

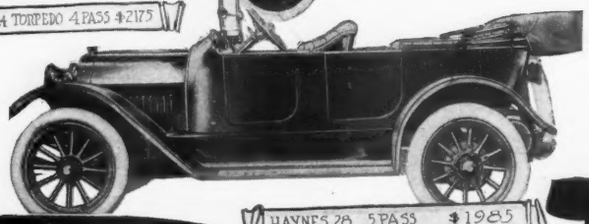
Four-Passenger Tourists and Miscellaneous

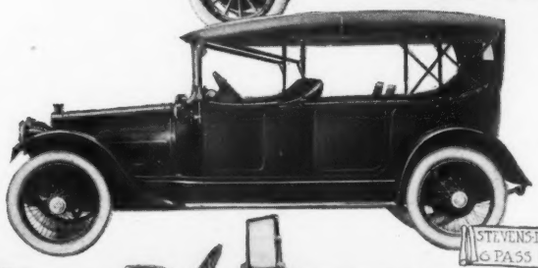
MARMON 48 6
4 PASS $5000

PIERCE-ARROW 48 B2
5 PASS $4800



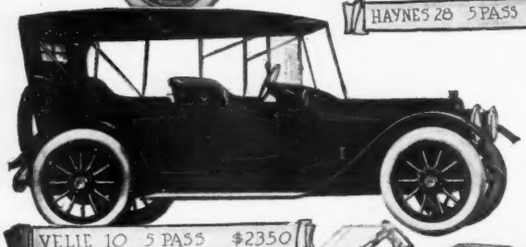
HALMERS 6 24 TORPEDO 4 PASS $2175

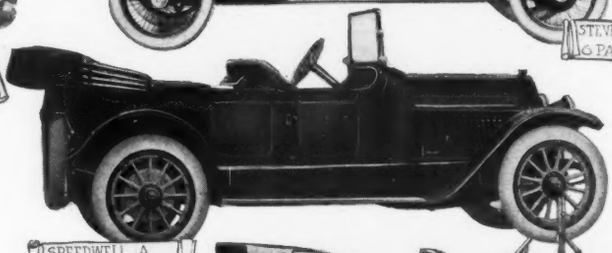




STEVENS-DURYEA C 6
6 PASS $5000

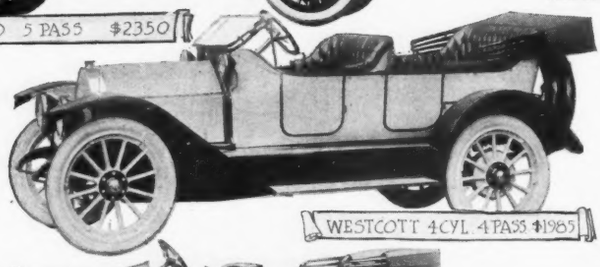
HAYNES 28 5 PASS $1985

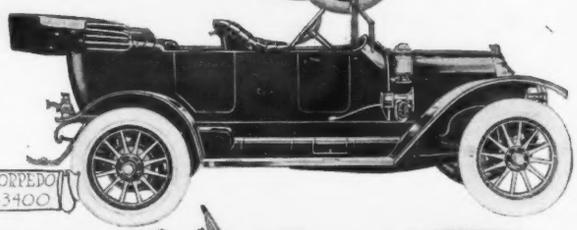




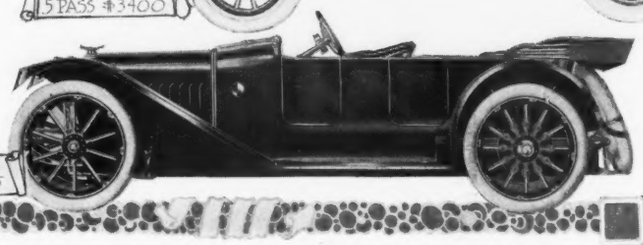
SPEEDWELL A
5 PASS $2850

VELIE 10 5 PASS $2350

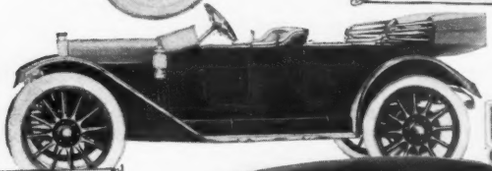




KNOX 44 TORPEDO
5 PASS $3400

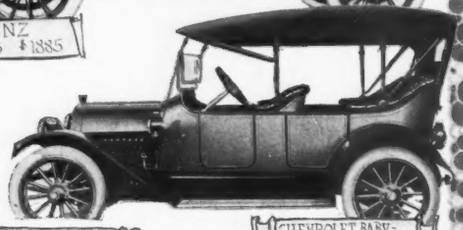


WESTCOTT 4 CYL 4 PASS $1985



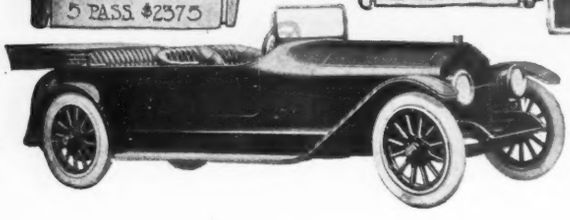
NORWALK D
4 PASS $2685

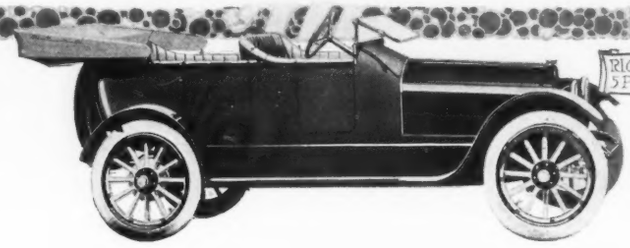
ARBENZ
4 PASS $1885



CHEVROLET BABY-
GRAND H4 4 PASS $875

NATIONAL 6
5 PASS $2375





RICHMOND T 2 6
5 PASS $1500

Pierce-Arrow 48 B-2, four-passenger touring, $4,800. 48.60 H.P.
Chalmers Six, 24, four-passenger torpedo, $2,175. 38.40 H.P., 132 W.B.
Chevrolet Baby Grand H-4, four-passenger touring, $875. 21.38 H.P., 104 W.B., 32 x 3½ tires.
Haynes 28-M, five-passenger touring, $1,985. 28.90 H.P., 118 W.B.
Knox 44, five-passenger torpedo, $3,400. 40.00 H.P., optional W.B.
Marmon 48, four, five and seven-passenger touring, $5,000. 48.60 H.P.
Speedwell A, four and five-passenger touring, $2,850. 40.80 H.P.
Velie 10, four and five-passenger touring, $2,350. 33.75 H.P., 126 W.B.
Westcott, four-cylinder, four-passenger, $1,985.
Richmond T, five-passenger touring, $1,500. 38.40 H.P., 123 W.B.
National Six, four-passenger touring, $2,375. 132 W.B., 36 x 4 tires.
Stevens-Duryea C 6, six-passenger, $5,000.
Arbenz, four-passenger, $1,885. 27.25 H.P., 120 W.B., 36 x 4 tires.
Norwalk D, four-passenger touring, $2,685. Electric gearshift, 36.06 H.P., 131 W.B., 37 x 4 tires.

Explanation of the Terms Used in the Specification Tables

How to Use the Tables

THE specification table on the following pages and the buyers's guide were compiled with one object in view, viz., to enable the prospective buyer to effect a purchase suitable to his needs. Let us take the prospectire purchaser as the first example. In the buyer's guide the motor cars are divided into classes according to price, and the intending purchaser should concentrate his efforts to the class in which are listed cars whose prices are within his means.

For example, A wishes to purchase a car costing not more than $2,800. It must be a seven-passenger car with a certain wheelbase and equipped to his satisfaction. The buyers' guide is consulted, starting with the cars in the $1,000 class. All the vehicles living up to the requirements are taken from that class and then the $1,500 class is looked over for cars that will answer the purpose. Since the $2,500 class includes cars whose prices are up to $2,999, this class, too, should be scanned. After all the seven-passenger cars with the desired wheelbase and equipment as to starter and lighting have been segregated, the next step is to compare the mechanical features of these various cars. This data is given in the table of specifications.

S. A. E. H. P.—Various formulas have been used for the horsepower rating of gas engines, but in these tables the horsepower is calculated from the formula adopted by the Society of Automobile Engineering, $D^2N \div 2.5$. D^2 is the square of the piston diameter or bore in inches and N is the number of cylinders. The denominator is the constant that the engineers have concluded to be practical.

Piston Displacement—The space the piston sweeps through in the cylinder during the stroke is known as the piston displacement. In Fig. 3, B is the top dead center and C the top of the piston at the lower end of the stroke. A is the piston displacement. The volume of A is found by multiplying the square of the bore in inches by .7854 and this result by the stroke in inches.

Cylinder Shapes—The expressions, T-Head, L-head and I-head, refer to cylinders whose shape resembles the letters, T, L and I.

Valve Location—This is given as right, left, opposite, head, or left and head, etc. When right or left is mentioned, it means both valves are on the right or left hand of a person sitting in the seat. In the case of motors with valves in the head, designated in the table by head, is meant both valves in the head or top of the cylinder.

Camshaft Drive-gear, chain and helical are mentioned. When spur is stated, a plain spur gear drives the camshaft. Helical camshaft drive includes spiral, helical and skew gear drives since these three are practically synonymous. The chain drive is a silent chain operating the timing gears.

Lubricating system—The splash system is one in which the ends of the connecting rods dip into the oil reservoir in the crankcase and perhaps a pump used to bring the supply up to the level. In the pressure system, oil is delivered directly from the oil tank to the bearings by means of a pump and pipe connections, no splash being used in this case. The splash-pressure system is a combination of the two foregoing. In the non-circulating system the oil is used but once.

Types of Lubricating Pump—Centrifugal pumps consist of a wheel with a hollow hub and holes between the long curved blades. As the wheel revolves the oil fed to the hub is pushed through the holes and forced upward by the teeth. The piston or plunger pump operates on the same principle as the tire pump. In a few cases wheel pumps are mentioned and these consist of a paddle wheel in flywheel revolving in the oil reservoir. Gear pumps are two-spur gears in mesh whose teeth carry the oil through.

Ignition System—The single system consists of one source of current and one set of spark plugs. The dual system consists of two sources of current, usually a battery and magneto and one set of plugs. The double system consists of a battery and magneto and two sets of plugs, with only one set sparking during motor operation. Two-point ignition requires the use of two sources of current and two sets of plugs. In this case both sets of plugs may operate at once.

Ignition Make—Where the word optional is used, the manufacturer gives the buyer his choice of two or more makes. The Atwater-Kent system is merely a transformer set in which current from dry cells is passed through a booster coil.

Control—Fixed control is one in which the spark is fixed so that it will occur at a given point in the cycle and cannot be changed without removing the magneto and retiming it. On the other hand, the governed control is one in which the spark automatically advances with motor speed.

Clutches—Both dry-disk and disk clutches running in oil are classed in the tables as disk. This also includes single-disk and multiple-disk. Those of the expanding and contracting band varieties are bands or shoes that contract or expand against the flywheel.

Gearset Type—In the selective type of gearset any speed may be obtained without first going through any other speed. In the progressive, high speed cannot be obtained without first passing through the intermediate speeds. The friction transmission consists of a driven disk pressing against another disk known as the driving disk, the later, in turn, being attached to a shaft, which directly or indirectly turns the wheels.

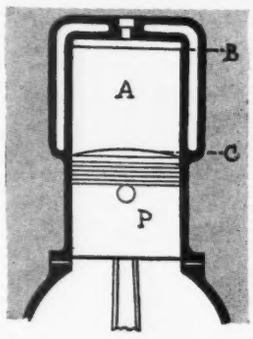


FIG. 1—PISTON DISPLACEMENT

Location Gearset—Unit with the rear axle, expressed as unit X in the table, refers to the gearset and differential housing being a unit. The expression unit M means that the motor and gearset housings are integral. In the case of amidships the gearset is midway between motor and rear axle.

Final Drive—In what is called bevel drive, the power is transmitted from the propellor shaft through bevel gears to the rear wheels and in the case of worm drive, gears of the worm type transmit the power to the rear wheels from the shaft. In chain drive the motive power is carried from the jackshaft to the rear wheels by means of one or more chains.

Car Drives Through—Tor T refers to torsion tube and in the diagram this is shown as a tube surrounding the drive shaft. The torsion rod is simply a bar of steel fastened at one end to the differential case and at the other to a cross member of the frame. Radius rods, shown as Rad R in the tables to the frame and rear axle housing. "Springs" means that the car is propelled through the rear springs.

Rear Axle—Four types of axles are used. The dead axle will be found only on cars driven by two chains, one to each rear wheel, the axle in this case not turning. In the floating axle, the entire weight over the rear wheels rests on the axle housing and wheel hubs. The axle shafts simply serve as a means of rotating the wheels and carry no weight In the case of the semifloating axle the bearing is in the axle housing and the axle may not be removed with first removing the wheel and then the axle bearing. This type of axle is required to carry some of the weight of the car. The three-quarter floating axle is the mean between the floating and the semi-floating, the axle carrying part of the weight and the housing the rest.

Gear Ratio—Crankshaft speed to wheel speed on high gear is what the figures in the table show; that is, if the gear ratio is given at 3.75-1, it means that the motor turns over 3.75 times to one revolution of the wheels on direct. It is the relation of the speed of M to that of N in Fig. 4.

Springs—B shows the semi-elliptic, C the three-quarter and when the view takes in the dotted line also the elliptic spring. If attached to the frame at D it is seven-eighths elliptic. A shows the platform.

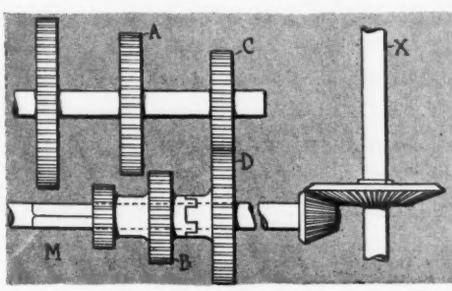


FIG. 2—HOW GEAR RATIO IS CALCULATED

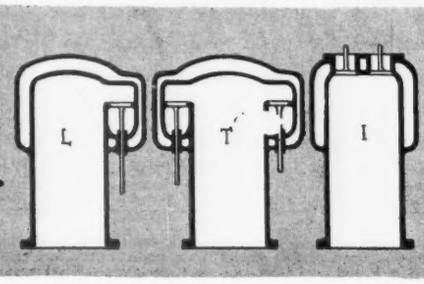


FIG. 3—AN ILLUSTRATION OF L-HEAD, T-HEAD AND I-HEAD CYLINDERS

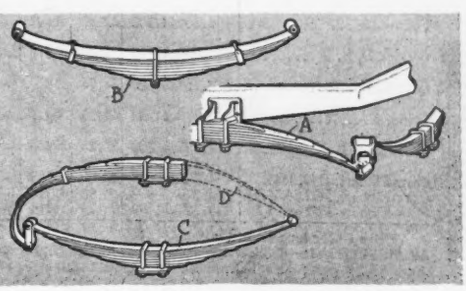


FIG. 4—DIFFERENT SPRING TYPES ILLUSTRATED

1914 Specifications of American

Complete Technical Details of Each of the Chassis Models of Passenger Vehicles Produced by American Makers for the 1914 Season, Including S. A. E. Horsepower Ratings of Each, and Piston Displacement in Cubic Inches, as Well as Equipment of Carbureters and Magnetos

MAKE AND MODEL	No. of Cylinders	Bore and Stroke, Inches	S. A. E. H. P.	Piston Displacement Cubic Inches	CYLINDERS		Valve Location	Camshaft Drive	Cooling Circulation	LUBRICATION		IGNITION			CARBURETION			CRANKING SYSTEM	
					Shape	How Cast				System	Type of Pump	System	Make	Control	Make of Carbureter	Fuel Feed	Is Hot Air Pipe Fitted?	Type	Make
Abbott-Detroit, 34-40-K	4	4.125x5.250	27.25	280.6	L-Head	Block	Left	Hel'l	Pump	Splash	Gear	Dual	Spld'rf	Hand	Zenith	Grav	Yes	Elec	Autolite
Abbott-Detroit, 44-50-L	4	4.500x5.250	32.40	349.9	L-Head	Pairs	Left	Hel'l	Pump	Splash	Gear	Dual	Spld'rf	Hand	Zenith	Grav	Yes	Elec	Autolite
Abbott-Detroit, Belle Isle	6	3.750x5.250	33.75	347.8	L-Head	Threes	Right	Hel'l	Pump	Splash	Gear	Sing	Bosch	Hand	Zenith	Pres	Yes	Elec	Autolite
Allen, 40	4	4.125x5.000	27.25	267.3	L-Head	Block	Lelt	Gear	Thermo	Splash	Piston	Dual	Spld'rf	Hand	Rayfield	Grav	Yes	Elec	Autolite
American, 6-44**	6	4.250x5.500	43.35	468.0	T-Head	Block	Opp	Hel'l	Pump	Splash	Piston		Eisemann	Hand	Rayfield	Pres	No	Elec	Disco
American, 6-46**	6	4.250x5.500	43.80	468.0	T-Head	Block	Opp	Hel'l	Pump	Splash	Piston		Eisemann	Hand	Rayfield	Pres	No	Elec	Disco
Ames, 45	4	4.125x5.250	27.25	280.6	L-Head	Block	Left	Hel'l	Pump	Spl-Pres	Piston	Dual	Remy	Hand	Schebler	Grav		Elec	Gray & Davis
Apperson, 4-45	4	4.500x5.000	32.40	318.1	T-Head	Sep	Opp	Hel'l	Pump	Pres	Gear	Dual	Nat'l	Hand	Rayfield	Grav	Yes	Elec	Undecided
Apperson, 4-45	4	4.500x5.000	32.40	318.1	T-Head	Sep	Opp	Hel'l	Pump	Pres	Gear	Sing	Mea	Hand	Rayfield	Grav	Yes	Elec	Undecided
Apperson, 6-45	6	3.750x5.500	33.75	364.4	L-Head	Block	Side	Hel'l	Pump	Splash	Gear	Sing	Mea	Hand	Rayfield	Grav	Yes	Elec	Undecided
Apperson, 6-45	6	3.750x5.500	33.75	364.4	L-Head	Block	Side	Hel'l	Pump	Splash	Gear	Sing	Mea	Hand	Rayfield	Grav	Yes	Elec	Undecided
Apperson 6-55	6	4.250x5.000	43.80	425.4	L-Head	Block	Side	Hel'l	Pump	Pres	Gear	Sing	Mea	Hand	Rayfield	Grav	Yes	Elec	Undecided
Apperson, 6-55	6	4.250x5.000	43.80	425.4	L-Head	Block	Side	Hel'l	Pump	Pres	Gear	Sing	Mea	Hand	Rayfield	Grav	Yes	Elec	Undecided
Arbens	4	4.125x5.500	27.25	294.0	L-Head	Pairs	Left	Hel'l	Pump	Spl-Pres	Gear	Dual		Hand	Schebler	Grav	Yes	Elec	
Auburn, 4-40 & 4-41	4	4.500x5.000	32.40	318.1	T-Head	Block	Opp	Hel'l	Pump	Splash	Gear	Dual	Remy	Hand	Schebler	Pres	Yes	Elec	Remy
Auburn, 6-45	6	3.750x5.250	33.75	347.8	L-Head	Pairs	Left	Hel'l	Pump	Splash	Piston	Dual	Simms	Hand	Rayfield	Grav	Yes	Elec	Remy
Auburn, 6-46	6	3.750x5.250	33.75	347.8	L-Head	Pairs	Left	Hel'l	Pump	Splash	Piston	Dual	Simms	Hand	Rayfield	Grav	Yes	Elec	Remy
Austin, 55	6	4.000x5.500	38.40	414.7	T-Head	Threes	Opp	Hel'l	Pump	Splash	Gear	Dual	Simms	Hand		Grav	No	Elec	Remy
Austin, 77	6	4.500x7.000	48.60	667.9	T-Head	Sep	Opp	Hel'l	Pump	Splash	Noncir	Doub	Simms	Hand		Grav	No	Air	Own
Buick, B24, B25	4	3.750x3.750	22.50	165.6	I-Head	Pairs	Head	Hel'l	Pump	Splash	Gear	Dual	Delco	Hand	Marvel	Grav	Yes	Elec	Delco
Buick, B36, B37, B38	4	3.750x5.000	22.50	220.9	I-Head	Pairs	Head	Hel'l	Pump	Splash	Gear	Dual	Delco	Hand	Marvel	Pres	Yes	Elec	Delco
Buick, B-55	6	3.750x5.000	33.75	331.4	I-Head	Pairs	Head	Hel'l	Pump	Splash	Gear	Dual	Delco	Hand	Marvel	Pres	Yes	Elec	Delco
Cadillac, 1914	4	4.500x5.750	32.40	365.8	L-Head	Sep	Right	Chain	Pump	Splash		Dual	Delco	H & A	Own	Pres	Yes	Elec	Delco
Cameron	4	3.625x5.000	20.25	206.4	I-Head	Block	Head	Gear	Thermo	Splash	Piston	Dual		Hand	Kingston	Grav	Yes	Elec	Diehl
Cartercar, 7	4	3.500x5.000	19.60	192.4	L-Head	Block	Left	Hel'l	Pump	Splash	Piston	Dual	Delco	Hand	Schebler	Pres	Yes	Elec	Delco
Cartercar, 5	4	4.125x4.750	27.25	253.9	L-Head	Pairs	Left	Hel'l	Pump	Splash	Piston	Dual	Briggs	Hand	Schebler	Grav-P	Yes	Elec	Jesco
Case, 25	4	3.750x4.750	22.50	209.9	T-Head	Pairs	Opp	Hel'l	Pump	Splash	Piston	Dup'x	Bosch	Hand	Rayfield	Grav	Yes	Elec	Westing'se
Case, 35	4	4.250x5.500	28.90	312.0	T-Head	Pairs	Opp	Hel'l	Pump	Splash	Gear	Dual	Bosch	Hand	Rayfield	Grav	Yes	Elec	Westing'se
Case, 40	4	4.500x5.250	32.40	334.0	T-Head	Pairs	Opp	Hel'l	Pump	Splash	Gear	2-Pt	Bosch	Hand	Rayfield	Pres	No	Elec	Westing'se
Chadwick, 19	6	5.000x6.000	60.00	721.0	L-Head	Pairs	S & H	Hel'l	Pump	Pres	Piston	Doub	Bosch	Hand	Own	Pres	Yes	Elec	Westing'se
Chadwick, 19	6	5.000x6.000	60.00	721.0	L-Head	Pairs	S & H	Hel'l	Pump	Pres	Piston	Doub	Bosch	Hand	Own	Pres	Yes	Elec	Westing'se
Chalmers, 24	6	4.000x5.500	38.40	414.7	T-Head	Threes	Opp	Hel'l	Pump	Spl-Pres	Gear	Sing	Bosch	Hand	Rayfield	Pres	Yes	Elec	Chal. Entz
Chandler, 14	6	3.375x5.000	27.40	268.4	L-Head	Block	Right	Chain	Pump	Splash	Gear	Sing	Bosch	Hand	Stromberg	Pres	Yes	Elec	Westing'se
Chevrolet, H-2	4	3.690x4.000	21.38	170.9	I-Head	Block	Head	Hel'l	Thermo	Splash	Gear	Sing	Simms	Hand	Zenith	Grav	Yes	Elec	Autolite Ex
Chevrolet, H-4	4	3.690x4.000	21.38	170.9	I-Head	Block	Head	Hel'l	Thermo	Splash	Gear	Sing		Hand	Zenith	Pres	Yes	Elec	Autolite Ex
Chevrolet, L	6	3.315x5.250	26.40	271.5	L-Head	Threes	Right	Hel'l	Thermo	Splash	Piston			Hand	Zenith	Pres	Yes	Elec	Autolite
Coey, A	4	5.500x5.250	48.40	498.9	T-Head	Pairs	Opp	Hel'l	Thermo	Spl-Pres	Gear	Dual	Bosch	Hand	Schebler	Grav			
Colby, 6C	6	4.125x5.250	40.90	420.9	L-Head	Pairs	Left	Hel'l	Pump	Splash	Piston	Doub	Eisemann	Hand	Rayfield	Pres	Yes	Elec	Gray & Davis
Cole, Four	4	4.250x5.250	28.90	297.8	L-Head	Pairs	Left	Hel'l	Pump	Splash	Piston	Dual	Delco	H & A	Stromberg	Pres	Yes	Elec	Delco
Cole, Six	6	4.250x5.250	43.80	446.7	L-Head	Pairs	Left	Chain	Pump	Splash	Piston	Dual	Delco	H & A	Stromberg	Pres	Yes	Elec	Delco
Continental, 30	4	3.500x5.000	19.60	192.4	L-Head	Block	Right	Hel'l	Thermo	Splash	Gear	Sing		Gov		Grav	Yes	Elec	Opt
Continental, 27	4	4.500x4.500	32.40	286.3	L-Head	Block	Right	Hel'l	Pump	Splash	Cent	Dual	Remy	Hand	Schebler	Grav	No	Elec	Jesco
Corbitt, D, E, F	4	4.000x4.500	25.60	236.2	L-Head	Pairs	Left	Hel'l	Pump	Spl-Pres	Gear	Doub	At Kent	Hand	Stromberg	Grav	Yes	Elec	Northeast
Correja, H	6	3.750x5.500	33.75	363.4	L-Head	Block	Right	Hel'l	Pump	Splash	Piston	Sing	Simms	Hand	Zenith	Pres	Yes	Elec	Ward-L'd
Crane, 4	6	4.375x6.250	45.95	563.7	L-Head	Threes	Left	Chain	Pump	Pres	Gear	Dual	Bosch	Hand	Newcomb	Pres	No	Elec	Rushmore
Croxton, A, B, X	4	4.125x5.500	27.25	294.0	L-Head	Block	Right	Hel'l	Thermo	Splash	Piston	Dual	Mea	Hand	Planhard	Grav			
Crow-Elkhart, D42, D45	4	4.000x5.000	25.60	251.3	L-Head	Pairs	Left	Gear	Thermo	Splash	Piston	Dual	Briggs	Hand	Schebler	Grav	Yes	Acet	Prestolite
Crow-Elkhart, D52,54,55,56	4	4.250x5.500	28.90	312.0	L-Head	Block	Left	Gear	Thermo	Splash	Piston	Dual	Briggs	Hand	Schebler	Grav	Yes	Elec	Emerson
Crow-Elkhart, D62,64,65,66	6	3.750x5.500	33.75	364.4	L-Head	Block	Left	Gear	Thermo	Splash	Piston	Dual	Briggs	Hand	Schebler	Grav	Yes	Elec	Emerson

**Has Underslung Frame.

ABBREVIATIONS:—**Cylinders:** Sep., separate. **Valve Location:** Opp., opposite; Head, both valves in the head; S. & H., side and head. **Cooling:** Thermo, thermo-syphon. **Lubrication:** Spl-pres, splash pressure; Pres, pressure; Flyw'l. flywheel; Cent, centrifugal; Ecc. eccentric. **Ignition:** Sing, single; Dup'x, duplex, Doub., double; 2-Pt, two-point; Westing'se, Westinghouse; Spld'rf, Splitdorf; At Kent, Atwater Kent; Nat'l, National; Connect, Connecticut; Mich., Michigan; H. & A., hand and automatic; Auto. automatic. **Fuel Feed:** Grav., gravity; Pres, pressure; Grav. P., pressure and gravity. **Cranking System:** Elec., electric; Mech., mechanical; Acet, acetylene; Ex, extra.

Gasoline Passenger Vehicle Chassis

Specifications Include Every Mechanical Fact that Manufacturers, Dealers, and Buyers Require—Motor Design Specially Analyzed, Giving Engine Starters and Oiling Systems, also Transmission, Running Gear and Control Features together with Tire Sizes and Spring Suspension

Lighting System	TRANSMISSION								RUNNING GEAR					CONTROL		BEARINGS				MAKE AND MODEL
	Clutch Type	GEARSET Type	GEARSET Location	GEARSET Forward Speeds	Final Drive	Car Drives Through	Rear Axle	Total Gear Ratio on Direct	Wheelbase	TIRES Front	TIRES Rear	Wheels	Rear Springs	Location Steering Wheel	Gearshift Location	Crankshaft Type and No.	Gearset	Rear Axle	Front Wheel	
Autolite	Disk	Sel	Unit M	4	Bevel	Rad Rd	Float	3.50–1	116	34x4	34x4	Wood	½ Ell	Right	Right	Plain, 3	Roll	B&R	Roll	Abbott-Detroit, 34-40-K
Autolite	Disk	Sel	Unit M	3	Bevel	Rad Rd	Float	3.50–1	121	36x4½	36x4½	Wood	½ Ell	Right	Right	Plain, 3	Roll	B&R	Roll	Abbott-Detroit, 44-50-L
Autolite	Disk	Sel	Unit M	4	Bevel	Rad Rd	Float	4.00–1	130	35x4½	35x4½	Wood	½ Ell	Left	Cent	Plain, 3	Roll	B&R	Roll	Abbott-Detroit, Belle Isle
Autolite	Disk	Sel	Unit M	3	Bevel	Springs	Float	4.00–1	118	34x4	34x4	Wood	½ Ell	Left	Cent	Plain, 3	Ball	Ball	Ball	Allen, 40
Disco	Cone	Sel	Amid	4	Bevel	Tor T	Float	3.60–1	132	38x4½	38x4½	Wood	½ Ell	Right	Right	Plain, 4	Ball	Ball	Ball	American, 6-44**
Disco	Cone	Sel	Amid	4	Bevel	Tor T	Float	3.60–1	140	38x4½	38x4½	Wood	½ Ell	Right	Right	Plain, 4	Ball	Ball	Ball	American, 6-46**
Gray & Davis	Disk	Sel	Unit M	3	Bevel	Springs	Float	3.50–1	118	36x4	36x4	Wood	½ Ell	Left	Cent	Plain, 3	Roll	Ball	Ball	Ames, 45
Undecided	Con Bd	Sel	Unit M	3	Bevel	Springs	Float	3.53–1	116	34x4	34x4	Wood	½ Ell	Left	Cent	Plain, 5	Ball	Ball	Ball	Apperson, 4-45
Undecided	Con Bd	Sel	Unit M	3	Bevel	Springs	Float	3.53–1	120	36x4	36x4	Wood	½ Ell	Left	Cent	Plain, 5	Ball	Ball	Ball	Apperson, 4-45
Undecided	Con Bd	Sel	Unit M	3	Bevel	Springs	Float	3.53–1	128	36x4	36x4	Wood	½ Ell	Left	Cent	Plain, 5	Ball	Ball	Ball	Apperson, 6-45
Undecided	Con Bd	Sel	Unit M	3	Bevel	Springs	Float	3.53–1	120	36x4	36x4	Wood	½ Ell	Left	Cent	Plain, 5	Ball	Ball	Ball	Apperson, 6-45
Undecided	Con Bd	Sel	Unit M	3	Bevel	Springs	Float	3.53–1	120	37x4½	37x4½	Wood	½ Ell	Left	Cent	Plain, 7	Ball	Ball	Ball	Apperson, 6-55
Undecided	Con Bd	Sel	Unit M	3	Bevel	Springs	Float	3.53–1	128	37x4½	37x4½	Wood	½ Ell	Left	Cent	Plain, 7	Ball	Ball	Ball	Apperson, 6-55
	Cone	Sel	Unit X	3	Bevel	Rad Rd	Float	3.75–1	120	36x4	36x4	Opt	½ Ell	Left	Cent	Plain, 3	Roll	Ball	Ball	Arbenz
Remy	Cone	Sel	Amid	3	Bevel	Tor R	Float	3.50–1	120	36x4	36x4	Wood	½ Ell	Left	Cent	Plain, 3	Ball	Ball	Ball	Auburn, 4-40 & 41
Remy	Cone	Sel	Amid	3	Bevel	Rad Rd	Float	3.50–1	130	37x4½	37x4½	Wood	½ Ell	Right	Right	Plain, 4	Ball	Ball	Ball	Auburn, 6-45
Remy	Cone	Sel	Amid	3	Bevel	Rad Rd	Float	3.50–1	130	37x4½	37x4½	Wood	½ Ell	Left	Cent	Plain, 4	Ball	Ball	Ball	Auburn, 6-46
Remy	Disk	Sel	Unit M	3	Bevel	Springs	Float	4.00–1*	141½	37x5	37x5	Wood	½ Ell	Left	Cent	Plain, 3	Ball	Ball	Ball	Austin, 55
Remy	Disk	Sel	Amid	4	Bevel	Springs	Float	3.00–1*	141½	37x5	37x5	Wood	½ Ell	Left	Cent	Plain, 7	Ball	Ball	Ball	Austin, 77
Delco	Cone	Sel	Amid	3	Bevel	Tor R	¾ Float	4.00–1	105	32x3½	32x3½	Wood	½ Ell	Left	Cent	Plain, 3	Ball	Roll	Ball	Buick, B24, B25
Delco	Cone	Sel	Unit M	3	Bevel	Tor R	¾ Float	4.00–1	112	34x4	34x4	Wood	½ Ell	Left	Cent	Plain, 3	Ball	Roll	Ball	Buick, B36, B37, B38
Delco	Cone	Sel	Unit M	3	Bevel	Tor R	Float	3.75–1	130	36x4½	36x4½	Wood	½ Ell	Left	Cent	Plain, 4	Ball	Ball	Ball	Buick, B-55
Delco	Cone	Sel	Amid	3	Bevel	Springs	Float	2.50–1*	120	36x4½	36x4½	Wood	½ Plat	Right	Right	Plain, 5	Ball	Roll	Roll	Cadillac, 1914
Diehl	Cone		Unit X	4	Bevel	Tor T	Float	3.00–1	115	32x3½	32x3½	Opt	Ell	Left	Cent	Plain, 3	Ball	Ball	Ball	Cameron
Delco		Fric	Amid		Chain	Rad Rd	¾ Float	3.45–1	106	32x3½	32x3½	Wood	½ Ell	Right	Right	Plain, 3	Ball	Roll	Ball	Cartercar, 7
Jesco		Fric	Amid		Chain	Rad Rd	¾ Float	3.60–1	116	36x4	36x4	Wood	½ Ell	Right	Right	Plain, 3	Ball	Ball	Ball	Cartercar, 5
Westing'se	Disk	Sel	Unit M	3	Bevel	Tor T	¾ Float	3.75–1	110	32x4	32x4	Wood	Plat	Left	Cent	Plain, 3	Roll	B&R	Ball	Case, 25
Westing'se	Disk	Sel	Unit M	3	Bevel	Springs	Float	3.50–1	120	35x4½	35x4½	Wood	½ Ell	Left	Cent	Plain, 3	Roll	B&R	Ball	Case, 35
Westing'se	Disk	Sel	Amid	3	Bevel	Springs	Float	3.67–1	124	37x4½	37x4½	Wood	½ Ell	Right	Right	Plain, 3	Roll	Roll	Roll	Case, 40
Westing'se	Exp Bd	Sel	Amid	4	Chain	Rad Rd	Dead	2.25–1	112	36x4½	36x4½	Wood	Plat	Right	Right	Plain, 4	Ball	Ball	Ball	Chadwick, 19
Westing'se	Exp Bd	Sel	Amid	4	Chain	Rad Rd	Dead	2.25–1	133	37x5	37x5	Wood	Plat	Right	Right	Plain, 4	Ball	Ball	Ball	Chadwick, 19
Chal-Entz	Disk	Sel	Unit M	4	Bevel	Tor R	Float	3.75–1	132	36x4½	36x4½	Opt	½ Ell	Left	Cent	Plain, 3	Roll	Roll	Roll	Chalmers, 24
Battery	Disk	Sel	Unit M	3	Bevel	Springs	Float	4.00–1	120	34x4	34x4	Wood	½ Ell	Left	Cent	Plain, 3	Ball	Ball	Ball	Chandler, 14
Autolite Ex	Cone	Sel	Amid	3	Bevel	Springs	Semi F	3.70–1	104	30x3½	30x3½	Wood	½ Ell	Left	Cent	Plain, 3	Ball	B&R	Ball	Chevrolet, H-2
Autolite Ex	Cone	Sel	Amid	3	Bevel	Springs	Semi F	4.00–1	104	32x3½	32x3½	Wood	½ Ell	Left	Cent	Plain, 3	Ball	B&R	Ball	Chevrolet, H-4
Autolite	Cone	Sel	Unit X	3	Bevel	Tor T	¾ Float	4.00–1	112	34x4	34x4	Wood	Plat	Left	Cent	Plain, 3	Roll	Roll	Ball	Chevrolet, L
	Disk	Sel	Unit X	3	Bevel	Springs	Semi F	3.00–1	128	34x4	34x4	Wood	½ Ell	Right	Cent	Plain, 3	Plain	Roll	Ball	Coey, A
Gray & Davis	Disk	Sel	Unit M	3	Bevel	Tor T	Float	3.66–1	136	37x5	37x5	Wood	½ Ell	Right	Right	Roll, 8	Roll	Roll	Roll	Colby, 6C
Delco	Cone	Sel	Unit M	3	Bevel	Springs	Float	4.23–1	120	34x4½	34x4½	Wood	½ Ell	Left	Cent	Plain, 3	Ball	Roll	Roll	Cole, Four
Delco	Cone	Sel	Unit M	3	Bevel	Springs	Float	3.93–1	136	36x4½	36x4½	Wood	½ Ell	Left	Cent	Plain, 3	Ball	Roll	Roll	Cole, Six
Opt	Disk	Sel	Unit M	3	Bevel	Springs	Float	4.00–1	110	32x3½	32x3½	Wood	½ Ell	Left	Cent	Plain, 3	Roll	Roll	Roll	Continental, 30
Jesco	Cone	Sel	Unit X	3	Bevel	Rad Rd	Opt	3.50–1	118	34x4	34x4	Wood	½ Ell	Right	Cent	Plain, 3	Ball	Ball	Roll	Continental, 27
Northeast	Disk	Sel	Unit M	3	Bevel	Springs	Float	3.78–1	120	34x4	34x4	Wood	½ Ell	Right	Cent	Plain, 3	Ball	Ball	Ball	Corbitt, D, E, F
Ward-L'd	Cone	Sel	Unit X	3	Bevel	Tor T	Float	4.00–1	128	34x4	34x4	Wood	½ Ell	Left	Cent	Plain, 4	Ball	Ball	Ball	Correja, H
Rushmore	Disk	Sel	Unit M	4	Bevel	Springs	Float	3.00–1	136½	36x4½	37x5	Wood	½ Ell	Left	Cent	Plain, 3	Ball	Ball	Ball	Crane, 4
Northeast	Disk	Sel	Amid	3	Bevel	Tor T	Float	3.50–1	121	36x4½	36x4½	Opt	½ Ell	Left	Cent	Plain, 3	Plain	Ball	Roll	Croxton, A, B
Briggs	Disk	Sel	Unit X	3	Bevel	Rad Rd	Semi F	4.00–1	114	33x4	33x4	Wood	Ell	Right	Cent	Plain, 3	Roll	Roll	Ball	Crow-Elkhart, D42, D45
Briggs	Disk	Sel	Unit X	3	Bevel	Rad Rd	¾ Float	4.00–1	120	34x4	34x4	Wood	Ell	Right	Cent	Plain, 3	Roll	Roll	Ball	Crow-Elkhart, D52, 54,5556
Briggs	Disk	Sel	Unit X	3	Bevel	Rad Rd	Float	4.00–1	130	36x4	36x4	Wood	½ Ell	Right	Cent	Plain, 4	Roll	Roll	Ball	Crow-Elkhart, D62,64,65,66

ABBREVIATIONS:—Clutch Type: Exp. B'l., expanding band; Con. Bd., contracting band. **Gearset:** Sel., selective; Prog., progressive; Plan., planetary; Fric., friction; Unit M, unit with the motor; Unit X, unit with the rear axle; Amid., amidships. **Drive:** Bevel, shaft with bevel gears in rear axle; Worm, shaft with worm gears in rear axle; Worm B, shaft with worm bevel gears in rear axle. **Car Drives Through:** Tor. T., torsion tube; Tor. R., torsion rod; Rad. Rd., radius rods; TTRR, torsion tube and radius rods. **Rear Axle:** Float, floating; Semi F., semi-floating; ¾ Float., three-quarter floating. **Gear Ratio:*** two speed rear axle. **Wheels:** Opt., optional. **Springs:** Ell., elliptic; ½ Ell., semi-elliptic; ¾ Ell, three-quarter elliptic; Plat., platform. **Gearshift:** Elec., electrically operated; **Bearings:** Roll., roller; B. & R., ball and roller; B. & P., ball and plain; B. R. & P., ball, roller and plain.

Specifications of American Pleasure Cars, Including Horsepower,

MAKE AND MODEL	CYLINDERS: No. of Cylinders	Bore and Stroke, Inches	S. A. E. H. P.	Piston Displacement Cubic Inches	CYLINDERS: Shape	CYLINDERS: How Cast	Valve Location	Camshaft Drive	Cooling Circulation	LUBRICATION: System	LUBRICATION: Type of Pump	IGNITION: System	IGNITION: Make	IGNITION: Control	CARBURETION: Make of Carburetor	CARBURETION: Fuel Feed	CARBURETION: Is Hot Air Pipe Fitted?	CRANKING SYSTEM: Type	CRANKING SYSTEM: Make
Cunningham, M	4	4.750x5.750	36.10	407.6	I-Head	Pairs	Head	Hel'l	Pump	Spl-Pres	Gear	Dual	Bosch	Hand	Rayfield	Pres	Yes	Elec	Northeast
Davis, 35 J&K	4	3.500x5.000	19.60	192.4	L-Head	Block	Right	Hel'l	Thermo	Splash		Sing	Westing'se	Hand	Stromberg	Grav	Yes	Elec	Westing'se
Davis, 50A	4	4.500x5.500	32.40	349.9	L-Head	Pairs	Left	Hel'l	Pump	Splash	Gear	Doub	Mea	Hand	Stromberg	Grav	Yes	Elec	Gray & Davis
Davis, 6-50	6	3.750x5.250	33.75	347.8	L-Head	Threes	Right	Hel'l	Pump	Spl-Pres	Gear		Mea	Hand	Stromberg	Pres	Yes	Elec	Gray & Davis
Day Utility, D	4	4.000x4.500	25.60	226.2	L-Head	Pairs	Left	Gear	Pump	Splash	Gear	Doub	Remy	Hand	Schebler	Grav	No		
Detroiter, A	4	3.500x5.000	19.60	192.4	L-Head	Block	Right	Hel'l	Thermo	Splash		Dual	Bosch	Hand	Stromberg	Grav	Yes	Elec	Remy Ex
DeSoto, Six	6	4.000x5.000	38.40	376.9	L-Head	Pairs	Left	Hel'l	Pump	Spl-Pres	Gear	Dual	Remy	Hand	Schebler	Pres	No	Air	Own
Dispatch, 1914	4	3.750x5.000	22.50	220.9	L-Head	Block	Left	Hel'l	Thermo	Pres	Gear	Dual	Spld'rf	Hand	Zenith	Grav	No	Elec	U. S. L. Ex
Dorris, I	4	4.375x5.000	30.63	300.7	I-Head	Pairs	Head	Hel'l	Pump	Splash	Gear	Sing	Bosch	Hand	Fletcher	Pres	No	Elec	Westing'se
Duryea	2	3.750x3.750		82.8	2-Cycle	Sep			Air	In fuel		Sing	Batt	Hand	Heitger	Grav	No	Mech	Own
Empire, 31	4	3.750x4.500	22.50	198.8	L-Head	Pairs	Left	Spur	Thermo	Spl-Pres	Piston	Sing	Eisemann	Fixed	Holley	Grav	Yes		
Enger A, B, C, & G	4	4.500x5.250	32.40	334.0	L-Head	Pairs	Left	Hel'l	Pump	Splash	Cent	Dual	Remy	Hand	Schebler	Grav	No	Elec	Northeast Ex
Fal, Grayhound	4	4.250x5.500	28.90	312.0	L-Head	Block	Right	Hel'l	Pump	Splash		Dual	Westing'se	Hand	Schebler	Grav	Yes	Air	Thurber
Fal	4	4.250x5.500	28.90	312.0	L-Head	Block	Right	Worm	Pump	Spl-Pres		Sing	Westing'se	Hand	Schebler	Grav	No		
Fiat, 54	4	4.375x6.000	30.00	353.3	L-Head	Block	Right	Hel'l	Pump	Pres	Gear	Dual	Bosch	Hand	Own	Pres	No	Elec	Westing'seEx
Fiat, 55	4	5.125x6.750	42.00	557.0	L-Head	Block	Right	Hel'l	Pump	Pres	Gear	Dual	Bosch	Hand	Own	Pres	No	Elec	Westing'seEx
Fiat, 56	6	4.375x6.000	45.00	529.9	L-Head	Block	Right	Hel'l	Pump	Pres	Gear	Dual	Bosch	Hand	Own	Pres	No	Elec	Westing'seEx
Firestone, Col., 86-E	4	4.125x5.250	27.25	280.6	L-Head	Pairs	Left	Hel'l	Pump	Spl-Pres	Piston	Dual	Spld'rf	Hand	Schebler	Grav	No	Elec	Gray & Davis
Firestone, Col., 69D	4	4.500x5.000	32.40	318.1	L-Head	Pairs	Right	Hel'l	Pump	Spl-Pres	Piston	Doub	Mea	Hand	Schebler	Grav	No	Elec	
Firestone, Col., 60E	4	4.500x5.500	32.40	349.9	L-Head	Pairs	Right	Hel'l	Pump	Spl-Pres	Piston	Doub	Connect	Hand	Schebler	Grav	No	Elec	Gray & Davis
Firestone, Col., 90E	6	4.125x5.250	40.90	420.9	L-Head	Threes	Right	Hel'l	Pump	Spl-Pres	Piston	Doub	Connect	Hand	Rayfield	Grav	Yes	Elec	Gray & Davis
Flyer, A	4	2.750x4.500	12.10	107.0	L-Head	Block	Left	Hel'l	Thermo	Splash		Sing		Fixed	Optional	Grav	No	Elec	Ward-L'd
Ford, T	4	3.750x4.000	22.50	176.7	L-Head	Block	Right	Spur	Thermo	Splash		Sing	Own	Hand	Optional	Grav	Yes		
Franklin, 6-30	6	3.625x4.000	31.60	247.7	I-Head	Sep	Head	Hel'l	Air	Splash	Gear	Sing	Eisemann	Gov	Own	Grav-P	No	Elec	Frank.-Entu
Gleason, R	2	4.750x4.000	18.00	141.7	L-Head	Sep	Side	Gear	Thermo	Spl-Pres		Dual	Remy	Hand	Schebler	Grav	No.		
Glide, 36-42	4	4.125x5.250	27.25	280.6	L-Head	Block	Left	Hel'l	Pump	Splash	Piston	Dual	Westing'se	H & A	Schebler	Grav	No	Elec	Westing'se
Grant, 21	4	2.750x4.000	12.10	95.0	L-Head	Block	Right	Hel'l	Thermo	Splash	Noncir	Sing		Hand	Mayer	Grav	Yes	Elec	Extra
Great Southern, 50	4	5.190x6.000	43.05	507.2	L-Head	Pairs	Right	Gear	Pump	Spl-Pres	Gear	Dual	Bosch	Hand	Stromberg	Grav	No	Opt	Opt., Ex
Great Western, 1914	4	4.250x5.500	28.90	312.0	L-Head	Sep	Right	Hel'l	Pump	Splash	Piston	Dual	Kingston	Hand	Kingston	Grav	Yes	Elec	Gray & Davis
Great Eagle, B	4	4.750x5.500	36.10	389.9	T-Head	Pairs	Opp	Gear	Pump	Pres	Gear	Doub	Eisemann	Hand	Rayfield	Grav	Yes	Elec	Autolite
Havers, Six 44	6	3.750x5.000	33.75	331.4	L-Head	Pairs	Right	Hel'l	Thermo	Spl-Pres	Gear	Dual	Eisemann	Hand	Stromberg	Pres	Yes	Elec	Gray & Davis
Havers, Six 60	6	4.125x5.250	40.90	420.9	L-Head	Pairs	Right	Hel'l	Pump	Spl-Pres	Piston	Dual	Eisemann	Hand	Stromberg	Opt	Yes	Elec	Gray & Davis
Haynes, 28	4	4.250x5.500	28.90	312.0	L-Head	Pairs	Right	Hel'l	Pump	Splash	Piston	Dual	Simms	Hand	Stromberg	Pres	Yes	Elec	Leece-Nev
Haynes, 26	6	4.250x5.500	43.80	468.0	L-Head	Pairs	Right	Hel'l	Pump	Splash	Piston	Dual	Simms	Hand	Stromberg	Pres	Yes	Elec	Leece-Nev
Haynes, 27	6	4.250x5.500	43.80	468.0	L-Head	Pairs	Right	Hel'l	Pump	Splash	Piston	Dual	Simms	Hand	Stromberg	Pres	Yes	Elec	Leece-Nev
Henderson, DeLuxe	4	4.125x5.500	27.25	294.0	L-Head	Block	Right	Hel'l	Thermo	Splash	Piston	Dual	Eisemann	Hand	Optional	Grav	Yes	Elec	Ward-L'd
Henderson, Six	6	3.750x5.500	33.75	364.4	L-Head	Block	Right	Hel'l	Pump	Splash	Piston	Dual	Eisemann	Hand	Carter	Grav	Yes	Elec	Ward-L'd
Herreshoff, 4-30	4	3.375x4.500	18.25	161.0	L-Head	Block	Left	Spur	Thermo	Splash	Piston	Dual	Westing'se	Auto	Stromberg	Grav	Yes	Elec	Westing'se
Herreshoff, 6-40	6	3.375x4.500	27.25	241.5	T-Head	Block	Opp		Thermo	Splash	Piston	Dual	Westing'se	Auto	Stromberg	Grav	Yes	Elec	Westing'se
Holly, A1	6	4.000x5.000	38.40	376.9	T-Head	Threes	Opp	Hel'l	Pump	Splash	Gear	2-Pt	Remy	Hand	Stromberg	Grav	Yes	Opt	Opt
Howard, D	6	4.125x5.250	40.90	420.9	L-Head	Threes	Right	Hel'l	Pump	Spl-Pres	Piston	Doub	Bosch	Hand	Stromberg	Pres	Yes	Elec	Jesco
Hudson, 6-40	6	3.500x5.000	29.40	288.6	L-Head	Threes	Right	Hel'l	Pump	Spl-Pres	Piston	Dual	Delco	Hand	Zenith	Grav	Yes	Elec	Delco
Hudson, 6-54	6	4.125x5.250	40.90	420.9	L-Head	Threes	Left	Hel'l	Pump	Spl-Pres	Piston	Dual	Delco	Hand	Zenith	Grav	Yes	Elec	Delco
Hupmobile, 32	4	3.250x5.500	16.90	182.5	L-Head	Block	Left	Chain	Thermo	Spl-Pres	Flyw'l	Sing	Bosch	Hand	Zenith	Grav	Yes	Elec	Westing'seEx
Hupmobile, 32	4	3.250x5.500	16.90	182.5	L-Head	Block	Left	Chain	Thermo	Spl-Pres	Flyw'l	Sing	Bosch	Hand	Zenith	Grav	Yes	Elec	Westing'seEx
Illinois, K-14	4	4.250x4.750	28.90	269.4	L-Head	Pairs	Left	Hel'l	Pump	Splash	Gear	Dual	Remy	Hand	Schebler	Pres	No	Air	Kellogg
Imperial, 32	4	4.250x5.250	28.90	297.8	L-Head	Block	Left	Hel'l	Pump	Spl-Pres	Piston	Dual	Remy	Hand	Stromberg	Grav	Yes	Elec	Northeast
Imperial, 34	4	4.500x5.000	32.40	318.1	L-Head	Pairs	Left	Hel'l	Pump	Splash	Piston	Dual	Remy	Hand	Stromberg	Grav	Yes	Elec	Northeast
Imperial, 44-6	6	3.750x5.250	33.75	347.8	L-Head	Threes	Right	Hel'l	Pump	Splash	Piston	Dual	Remy	Hand	Stromberg	Grav	Yes	Elec	Northeast
Imperial, 54-6	6	4.125x5.250	40.90	420.9	L-Head	Threes	Right	Hel'l	Pump	Splash	Piston	Dual	Remy	Hand	Stromberg	Pres	Yes	Elec	Northeast
Inter-State, 45	6	4.000x5.000	38.40	376.9	L-Head	Block	Left	Hel'l	Pump	Spl-Pres	Gear	Doub	Mea	Hand	Optional	Pres	No	Elec	Aplco
Jackson, Olympic	4	4.125x4.750	27.25	253.9	L-Head	Pairs	Left	Hel'l	Pump	Spl-Pres	Piston	Dual	Remy	Hand	Schebler	Grav	Yes	Elec	Autolite
Jackson, Majestic	4	4.500x5.250	32.40	334.0	L-Head	Pairs	Left	Hel'l	Pump	Spl-Pres	Piston	Dual	Remy	Hand	Schebler	Grav	Yes	Elec	Autolite
Jackson, Sultanic	6	4.125x4.750	40.90	380.8	L-Head	Pairs	Left	Chain	Pump	Spl-Pres	Piston	Dual	Remy	Hand	Schebler	Grav	Yes	Elec	Autolite
Jeffery, 93	4	3.750x5.250	22.50	231.9	L-Head	Block	Left	Hel'l	Pump	Spl-Pres	Piston	Dup'x	Bosch	Hand		Pres	Yes	Elec	U. S. L.
Jeffery, 96	6	3.750x5.250	33.75	347.0	L-Head	Pairs	Left	Hel'l	Pump	Spl-Pres	Piston	Dup'x	Bosch	Hand	Rayfield	Pres	Yes	Elec	U. S. L.
King, B	4	3.875x5.000	24.00	235.8	L-Head	Block	Left	Hel'l	Thermo	Spl-Pres	Gear	Dual	Briggs	Hand	Stromberg	Grav	Yes	Elec	Ward-L'd
Kisselkar, 40	4	4.500x5.250	32.40	334.0	L-Head	Pairs	Left	Chain	Pump	Splash	Gear	Dup'x	Bosch	Hand	Stromberg	Pres	Yes	Elec	Kissel-Ester
Kisselkar, 48	6	3.750x5.500	33.75	364.4	L-Head	Block	Left	Hel'l	Pump	Pres	Gear	Sing	Bosch	Hand	Rayfield	Pres	Yes	Elec	Kissel-Ester
Kisselkar, 60	6	4.500x5.250	48.60	501.0	L-Head	Pairs	Left	Chain	Pump	Splash	Gear	Dual	Bosch	Hand	Rayfield	Pres	Yes	Elec	Kissel-Ester

**Has Underslung Frame.

ABBREVIATIONS:—Cylinders: Sep., separate. **Valve Location:** Opp., opposite; Head, both valves in the head; S & H., side and head. **Cooling:** Thermo, thermo-syphon. **Lubrication:** Spl-pres, splash pressure. Pres, pressure; Flyw'l, flywheel; Cent, centrifugal; Ecc, eccentric. **Ignition:** Sing, single; Dup'x, duplex; Doub., double; 2-Pt., two-point; Westing'se, Westinghouse; Spld'rf, Splitdorf; At Kent, Atwater Kent; Nat'l, Naitonal; Connect, Connecticut; Mich., Michigan; H. & A., hand and automatic; Auto, automatic. **Fuel Feed:** Grav., gravity; Pres, pressure; Grav. P., pressure and gravity. **Cranking System:** Elec,. electric; Mech., mechanical; Acet., acetylene; Ex., extra.

Carbureters, Starters, Magnetos, Etc, for 1914—Continued

Lighting System	TRANSMISSION: Clutch Type	GEARSET: Type	GEARSET: Location	GEARSET: Forward Speeds	TRANSMISSION: Final Drive	TRANSMISSION: Car Drives Through	TRANSMISSION: Rear Axle	TRANSMISSION: Total Gear Ratio on Direct	RUNNING GEAR: Wheelbase	TIRES: Front	TIRES: Rear	RUNNING GEAR: Wheels	RUNNING GEAR: Rear Springs	CONTROL: Location Steering Wheel	CONTROL: Gearshift Location	BEARINGS: Crankshaft Type and No.	BEARINGS: Gearset	BEARINGS: Rear Axle	BEARINGS: Front Wheel	MAKE AND MODEL
Northeast	Cone	Sel	Unit M.	3	Bevel	Springs	Float	3.43–1	124	36x4½	36x4½	Wood	½ Ell.	Left	Cent.	Plain, 3	Ball	Roll	Roll	Cunningham, M
Westing'se	Disk	Sel	Unit M.	3	Bevel	Springs	¾ Float	4.00–1	112	33x4	33x4	Wood	Plat.	Left	Cent.	Plain, 3	B&R.	Roll	Ball	Davis, 35 J&K
Gray & Davis	Cone	Sel	Unit M.	3	Bevel	Rad Rd.	Float	3.50–1	118	37x4½	37x4½	Wood	Plat.	Right	Cent.	Plain, 3	Ball	Ball	Ball	Davis, 50A
Gray & Davis	Disk	Sel	Unit M.	4	Bevel	Rad Rd.	Float	3.75–1	128	37x4½	37x4½	Wood	Plat.	Left	Cent.	Plain,	Ball	Ball	Ball	Davis, 6-50
	Disk	Sel	Unit M.	3	Bevel	Springs	Float	4.00–1	116	34x4½	34x4½	Wood	Ell	Right	Cent.	Ball, 3	Ball	Ball	Ball	Day Utility, D
Remy Ex.	Disk	Sel	Unit M.	3	Bevel	Tor R	Float	4.00–1	104	32x3½	32x3½	Wood	Plat.	Left	Cent.	Ball, 3	Ball		Ball	Detroiter, A
	Disk	Sel	Unit M	3	Bevel	Tor T	Float	3.50–1	132	36x4	36x4	Wood	Ell	Opt	Cent.	Plain, 4	Ball	Ball	Ball	DeSoto, Six
U. S. L. Ex	Disk	Fric	Amid	5	Chain	Rad Rd.	Dead	4.00–1	120	36x3½	36x3½	Wood	Ell	Right	Cent.	Plain, 3	Ball	Ball	Ball	Dispatch, 1914
Westing'se	Disk	Sel	Unit M.	3	Bevel	Tor R	Float	3.66–1	121	36x4½	36x4½	Wood	Plat	Left	Cent.	Plain, 3	Roll	Roll	Roll	Dorris, I
				2	Roller		Dead	8.00–1	86& 96	38x1½	44x1¾	Wood	½ Ell.	Cent	Pedal.	Plain. 4	Roll	Ball	Ball	Duryea
	Disk	Sel	Unit M.	3	Bevel	Springs	¾ Float	4.00–1	109	32x3½	32x3½	Wood	¾ Ell.	Right	Cent.	Plain, 3	Ball	Roll	Ball	Empire, 31
Northeast Ex	Disk	Sel	Unit M.	3	Bevel	Springs	Float	3.50–1	120	34x4	34x4	Wood	¾ Ell.	Right	Cent.	Plain, 3	Ball	Ball	Ball	Enger A,B,C&G
Westing'se	Disk	Sel	Amid	3	Bevel.	Springs	¾ Float	3.00–1	114	34x4	34x4	Wood	¾ Ell.	Right	Right	Plain, 3	Ball	Ball	Ball	Fal. Grayhound
Westing'se	Disk	Sel	Amid	3	Bevel	Tor T	Float	3.50.1	116	34x4	34x4	Wood	¾ Ell.	Right	Right	Plain, 3	Ball	Ball	Ball	Fal
West'se Ex.	Disk	Sel	Amid	4	Bevel	Tor T	Semi F	3.28–1	123	36x4½	36x4½	Wood	¾ Ell.	Right	Right	Plain, 3	Ball	Ball	Ball	Fiat, 54
West'se Ex.	Disk	Sel	Amid	4	Bevel	Tor T	Semi F	2.70–1	128	36x4½	37x5	Wood	¾ Ell.	Right	Right	Plain, 3	Ball	Ball	Ball	Fiat, 55
West'se Ex.	Disk	Sel	Amid	4	Bevel	Tor T	Semi F	3.06–1	135	36x4½	37x5	Wood	¾ Ell.	Right	Right	Plain, 4	Ball	Ball	Ball	Fiat, 56
Gray & Davis	Cone	Sel	Amid	3	Bevel	Springs	¾ Float	3.50–1	130	36x4	36x4	Wood	¾ Ell.	Left	Cent.	Plain, 3	Ball	Ball	Ball	Firestone, Col., 86-E
	Cone	Sel	Amid	3	Bevel	Springs	¾ Float	3.50–1	122	36x4	36x4	Wood	¾ Ell.	Left	Cent.	Plain, 3	Ball	Ball	Ball	Firestone, Col., 69D
Gray & Davis	Cone	Sel	Amid	3	Bevel	Springs	¾ Float	3.50–1	122	36x4	36x4	Wood	¾ Ell.	Left	Cent.	Plain, 3	Ball	Ball	Ball	Firestone, Col., 60E
Gray & Davis	Disk	Sel	Unit M.	3	Bevel	Springs	¾ Float	3.50–1	130	36x4½	36x4½	Wood	¾ Ell.	Left	Cent.	Plain, 3	Roll	Ball	Ball	Firestone, Col., 90E
Ward-L'd	Disk	Sel	Unit M.	2	Bevel	Springs	Float	4.00–1	100	28x3	28x3	Wire	½ Ell.	Left	Cent.	Plain, 3	Roll	Roll	Ball	Flyer, A
		Plan.	Unit M.	2	Bevel	Tor T	Semi F	3.64–1	100	30x3	30x3½	Wood	Cross	Left	Pedal.	Plain, 3	Plain	Roll	Ball	Ford, T
Frank'n-Entz	Disk	Sel	Amid	3	Bevel	Springs	Semi-F	3.71–1	120	34x4½	34x4½	Wood	Ell	Left	Cent.	Plain, 7	Ball	Roll	Roll	Franklin, 6-30
	Disk	Sel	Amid	3	Bevel	Tor R	Float	6.00–1	96	36x2	36x2	Wood	Ell	Right	Right	Plain, 2	Plain	Roll	Ball	Gleason, R
Westing'se	Disk	Sel	Unit M	3	Bevel	Springs	Float	3.50–1	118	34x4	34x4	Wood	½ Ell.	Left.	Cent.	Plain, 3	Roll	Ball	Ball	Glide, 36-42
Extra	Cone	Prog	Unit X.	2	Bevel	Tor T	¾ Float	4.50–1	90	28x3	28x3	Wire	Cross	Left	Cent.	Plain, 2	BR&P	Roll.	Ball	Grant, 21
Opt., Ex	Cone	Sel	Amid	3	Bevel	Springs	Semi F	2.60–1	128	36x4	36x4½	Wood	¾ Ell.	Right	Cent.	Plain, 3	Roll	Roll	Roll	Great Southern, 50
Gray & Davis	Cone	Sel	Unit M.	3	Bevel	Tor T	Float	3.50–1	118	36x4	36x4	Wood	¾ Ell.	Right	Right	Plain, 5	Ball	B&R.	Ball	Great Western, 1914
Autolite	Cone	Sel	Amid	3	Bevel	Rad R.	Float	3.39–1	135	37x5	37x5	Wood	Plat.	Left	Cent.	Plain, 3	Roll	Roll	Roll	Great Eagle, B
Gray & Davis	Disk	Sel	Unit M.	3	Bevel	Rad Rd.	Float	3.75–1	122	36x4	36x4	Wood	Plat.	Right	Right	Plain, 3	Ball	B&R.	Ball	Havers, Six 44
Gray & Davis	Disk	Sel	Unit M.	3	Bevel	Rad Rd.	Float	3.75–1	128	36x4½	36x4½	Wood	Plat	Right	Right	Plain, 3	Ball	B&R.	Ball	Havers, Six 60
Leece-Nev	Con Bd	Sel	Unit M.	3	Bevel	Tor R	Float	3.55–1	118	34x4	34x4	Wood	¾ Ell.	Left	Elec	Plain, 3	Roll	Roll	Roll	Haynes, 28
Leece-Nev	Con Bd	Sel	Unit M.	3	Bevel	Tor R	Float	3.66–1	130	36x4½	36x4½	Wood	¾ Ell.	Left	Elec	Plain, 4	Roll	Roll	Roll	Haynes, 26
Leece-Nev	Con Bd	Sel	Unit M.	3	Bevel	Tor R	Float	3.66–1	136	36x4½	36x4½	Wood	¾ Ell.	Left	Elec	Plain, 4	Roll	Roll	Roll	Haynes, 27
Ward-L'd	Cone	Sel	Unit X.	3	Bevel	Tor T	Float	3.65–1	116	35x4½	35x4½	Opt	¾ Ell.	Left	Cent.	Plain, 3	Ball	Roll	Ball	Henderson, DeLuxe
Ward-L'd	Cone	Sel	Unit X.	3	Bevel	Tor T	Float	3.50–1	126	35x4½	35x4½	Opt	¾ Ell.	Left	Cent.	Plain, 5	Ball	Ball	Ball	Henderson, Six
Westing'se	Disk	Sel	Unit M.	4	Bevel	Tor T	Semi F	4.00–1	110	32x3½	32x3½	Wood	½ Ell.	Left	Cent.	Plain, 2	P&B	Roll	Ball	Herreshoff, 4-30
Westing'se	Disk	Sel	Unit M	4	Bevel	Tor T	Semi F	4.00–1	124	34x4	34x4	Wood	½ Ell.	Left	Cent.	Plain, 3	P&B	Roll	Ball	Herreshoff, 6-40
Ward-L'd	Cone	Sel	Unit X.	3	Bevel	Tor T	¾ Float	3.25–1	130	35x4½	35x4½	Wood	Ell	Left	Cent.	Plain, 3	Plain	Ball	Ball	Holly, A1
Jesco	Cone	Sel	Unit M.	3	Bevel	Springs	Float	3.44–1	130	36x4½	36x4½	Wood	¾ Ell.	Left	Cent.	Plain, 3	Ball	Roll	Roll	Howard, D
Deleo	Disk	Sel	Unit M.	3	Bevel	Springs	Float	4.00–1	123	34x4	34x4	Wood	¾ Ell.	Left	Cent.	Plain, 3	Roll	Roll	Roll	Hudson, 6-40
Deleo	Disk	Sel	Unit M	4	Bevel	Tor R	Float	3.75–1	135	36x4½	36x4½	Wood	¾ Ell.	Left	Cent.	Plain, 3	P&R	Roll	Roll	Hudson, 6-54
West'se Ex.	Disk	Sel	Unit M.	3	Bevel	Tor T	Float	3.86–1	106	33x4	33x4	Wood	Cross	Right	Cent.	Plain, 3	B&R.	Roll	Roll	Hupmobile, 32
West'se Ex.	Disk	Sel	Unit M.	3	Bevel	Tor T	Float	3.86–1	126	33x4	33x4	Wood	Cross	Right	Cent.	Plain, 3	B&R.	Roll	Roll	Hupmobile, 32
	Disk	Sel	Amid	3	Bevel	Rad Rd.	Float	4.00–1	120	37x4	37x4	Wood	Ell	Right	Cent.	Plain, 3	Ball	Ball	Ball	Illinois, K-14.
Northeast	Disk	Sel	Unit M.	3	Bevel	Rad Rd.	¾ Float	3.50–1	114	34x4	34x4	Wood	¾ Ell.	Left	Cent.	Plain, 3	Ball	B&R.	Ball	Imperial, 32
Northeast	Disk	Sel	Unit M.	3	Bevel	Rad Rd.	¾ Float	3.50–1	118	34x4	34x4	Wood	¾ Ell.	Right	Cent.	Plain, 3	Ball	Ball	Ball	Imperial, 34
Northeast	Disk	Sel	Unit M.	3	Bevel	Tor T	Float	3.50–1	126	36x4½	36x4½	Wood	¾ Ell.	Left	Cent.	Plain, 3	Plain	B&R.	Ball	Imperial, 44-6
Northeast	Disk	Sel	Unit M.	3	Bevel	Rad R.	Float	3.50–1	137	36x4½	36x4½	Wood	¾ Ell.	Left	Cent.	Plain, 3	Plain	Ball	Ball	Imperial, 54-6
Apleo	Disk	Sel	Unit M.	4	Bevel	Springs	Float	3.50–1	132	36x4½	36x4½	Wood	¾ Ell.	Left	Cent.	Plain, 3	Ball	Ball	Ball	Inter-State. 45
Autolite	Cone	Sel	Unit M.	3	Bevel	Rad Rd.	Semi F	3.75–1	115	34x4	34x4	Wood	Ell	Right	Right	Plain, 3	Ball	B&R.	Ball	Jackson, Olympic
Autolite	Cone	Sel	Unit M.	3	Bevel	Rad Rd.	Float	3.50–1	124	36x4	36x4	Wood	Ell	Right	Right	Plain, 3	Ball	Ball	Ball	Jackson, Majestic
Autolite	Cone	Sel	Unit M.	3	Bevel	Rad Rd.	Float	4.00–1	132–38	36x4½	36x4½	Wood		Right	Right	Plain, 4	Ball	Ball	Ball	Jackson, Sultanic
U. S. L	Cone	Sel	Amid	4	Bevel	Tor R	Float	4.08–1	116	34x4	34x4	Wood	¾ Ell.	Left	Cent.	Plain, 3	Ball	Ball	Roll	Jeffery, 93
U. S. L.	Cone	Sel	Amid	4	Bevel	Tor R	Float	3.92–1	128	36x4½	36x4½	Wood	¾ Ell.	Left	Cent.	Plain, 4	Ball	Ball	Roll	Jeffery, 96
Ward-L'd	Disk	Sel	Unit M.	3	Bevel	Springs	Float	3.58–1	112	33x4	33x4	Wood	Cant	Left	Cent.	Plain, 3	Roll	Roll	Ball	King, B
Esterline	Cone	Sel	Amid	4	Bevel	Springs	Float	4.00–1	121	36x4	36x4	Wood	¾ Ell.	Left	Cent.	Plain, 3	Plain	Roll	Roll	Kisselkar, 40
Esterline	Cone	Sel	Unit M.	4	Bevel	Springs	Float	4.00–1	132	36x4½	36x4½	Wood	¾ Ell.	Left	Cent.	Plain, 4	Plain	Roll	Roll	Kisselkar, 48
Esterline	Cone	Sel	Amid	4	Bevel	Springs	Float	3.76–1	142	37x5	37x5	Wood	¾ Ell.	Left	Cent.	Plain, 4	Plain	Roll	Roll	Kisselkar, 60

ABBREVIATIONS:—Clutch Type: Exp. Bd., expanding band; Con. Bd., contracting band. **Gearset:** Sel., selective; Prog., progressive; Plan., planetary; Fric., friction; Unit M, unit with the motor; Unit X, unit with the rear axle; Amid., amidships. **Drive:** Bevel, shaft with bevel gears in rear axle; Worm, shaft with worm bevel gears in rear axle; Worm B, shaft with worm bevel gears in rear axle.* **Car Drives Through:** Tor. T., torsion tube; Tor. R., torsion rod; Rad. Rd., radius rods; TTRR, torsion tube and radius rods. **Rear Axle:** Float, floating; Semi F., semi-floating; ¾ Float., three-quarter floating. **Gear Ratio:*** two speed rear axle. **Wheels:** Opt., optional. **Springs:** Ell., elliptic; ½ Ell., semi-elliptic; ¾ Ell, three-quarter elliptic; Plat., platform. **Gearshift:** Elec., electrically operated. **Bearings:** Roll. roller; B. & R., ball and roller; B. & P., ball and plain; B. R. & P., ball, roller and plain.

Specifications of American Pleasure Cars, Including Horsepower,

MAKE AND MODEL	No. of Cylinders	Bore and Stroke, Inches	S. A. E. H. P.	Piston Displacement Cubic Inches	CYLINDERS		Valve Location	Camshaft Drive	Cooling Circulation	LUBRICATION		IGNITION			CARBURETION			CRANKING SYSTEM	
					Shape	How Cast				System	Type of Pump	System	Make	Control	Make of Carbureter	Fuel Feed	Is Hot Air Pipe Fitted?	Type	Make
Klinekar, 4-30	4	4.000x4.625	25.60	232.5	L-Head	Block	Right	Hel'l	Pump	Spl-Pres	Gear	Dual	Bosch	Hand	Stromberg	Grav	Yes	Elec	Rushmore
Klinekar, 4-40	4	4.320x5.750	29.71	335.9	T-Head	Block	Opp	Hel'l	Pump	Spl-Pres	Gear	Doub	Bosch	Hand	Stromberg	Grav	Yes	Elec	Rushmore
Klinekar, 6-50	6	4.125x5.500	40.90	441.0	T-Head	Block	Opp	Hel'l	Pump	Spl-Pres	Gear	Dual	Bosch	Hand	Stromberg	Grav	Yes	Elec	Rushmore
Klinekar, 6-60	6	4.320x5.750	44.88	503.8	T-Head	Pairs	Opp	Hel'l	Pump	Spl-Pres	Gear	Dual	Bosch	Hand	Stromberg	Grav	Yes	Elec	Rushmore
Knox, 44	4	5.000x5.500	40.00	431.9	I-Head	Sep	Head	Hel'l	Pump	Spl-Pres	Gear	Doub	Bosch	Hand	Stromberg	Grav	Yes	Elec	Esterline
Knox, 45	4	5.000x5.500	40.00	431.9	I-Head	Sep	Head	Hel'l	Pump	Spl-Pres	Gear	Doub	Bosch	Hand	Stromberg	Grav	Yes	Elec	Esterline
Knox, 46	6	4.375x5.500	45.95	496.0	I-Head	Pairs	Head	Chain	Pump	Spl-Pres	Gear	Doub	Bosch	Hand	Scott	Grav	Yes	Elec	Esterline
Knox, 66	6	5.000x5.500	60.00	647.8	I-Head	Pairs	Head	Gear	Pump	Spl-Pres	Gear	Doub	Bosch	Hand	Stromberg	Grav	Yes	Elec	Esterline
Krit, L	4	3.750x4.000	22.50	176.7	L-Head	Block	Right	Hel'l	Thermo	Splash	Flyw'l	Sing	Bosch	Hand	Stromberg	Grav	Yes	Elec	Disco Ex
Lambert, 46	4	3.750x5.250	22.50	231.9	L-Head	Block	L & H	Hel'l	Pump	Spl-Pres	Piston	Dual	Briggs	Hand	Schebler	Grav	Yes	Elec	Briggs
Lambert, 60	4	4.125x5.250	27.25	280.6	L-Head	Block	L & H	Hel'l	Pump	Spl-Pres	Piston	Dual	Briggs	Hand	Schebler	Grav	Yes	Elec	Disco
Lenox, 4	4	4.250x5.500	28.90	312.0	L-Head	Block	Right	Hel'l	Pump	Spl-Pres	Piston	Sing	Eisemann	Hand	Own	Grav	No	Elec	Gray & Davis
Lenox, 6	6	4.000x5.000	38.60	376.9	T-Head	Threes	Opp	Hel'l	Pump	Spl-Pres	Gear	Sing	Eisemann	Hand	Own	Grav	No	Elec	Gray & Davis
Lewis, Six	6	3.500x6.000	29.40	346.4	L-Head	Block	Right	Chain	Pump	Splash	Flyw'l	Dual		Hand		Grav	Yes	Elec	
Locomobile, 38-LD&RD	6	4.250x5.000	43.80	425.4	T-Head	Pairs	Opp	Hel'l	Pump	Spl-Pres	Gear	Dual	Bosch	Hand	Own	Pres	Yes	Elec	Gray & Davis
Locomobile, 48-LD	6	4.500x5.500	48.60	524.8	T-Head	Pairs	Opp	Hel'l	Pump	Spl-Pres	Gear	Dual	Bosch	Hand	Own	Pres	Yes	Elec	Gray & Davis
Locomobile, 48-RD	6	4.500x5.500	48.60	524.8	T-Head	Pairs	Opp	Hel'l	Pump	Spl-Pres	Gear	Dual	Bosch	Hand	Own	Grav	Yes	Elec	Gray & Davis
Lozier, 77	6	3.875x5.500	36.06	389.1	L-Head	Threes	Right	Hel'l	Pump	Spl-Pres	Gear	Sing	Bosch	Hand	Rayfield	Pres	Yes	Elec	Gray & Davis
Lozier, Four	4	4.250x6.500	28.90	368.8	L-Head	Block	Left		Pump	Press			Bosch	Hand				Elec	Gray & Davis
Luverne, 7-60	6	4.000x5.000	38.60	376.9	L-Head	Pairs	Left	Hel'l	Thermo	Splash	Gear	Dual	Bosch	Hand	Rayfield	Grav	No	Air	Kellogg
Lyons-Knight, K-4	4	4.500x5.500	32.40	349.9	Knight	Pairs	Sleeve	Chain	Pump	Pres	Piston	Dual	Simms	H & A	Stromberg	Grav	Yes	Elec	Northeast
Marathon, Runner	4	3.500x4.500	19.60	173.2	L-Head	Pairs	Right	Hel'l	Thermo	Splash	Flyw'l	Dual	Remy	Hand	Marvel	Grav	Yes	Elec	Jesco Ex
Marathon, Winner	4	4.250x4.500	28.90	255.3	L-Head	Pairs	Right	Hel'l	Thermo	Splash	Flyw'l	Dual	Remy	Hand	Marvel	Grav	Yes	Elec	Jesco
Marathon, Champion	4	4.500x5.125	32 60	326.1	L-Head	Pairs	Right	Hel'l	Thermo	Splash	Flyw'l	Dual	Remy	Hand	Marvel	Grav	Yes	Elec	Alpco
Marion, B	4	4.000x5.000	25.60	251.3	L-Head	Pairs	Left	Hel'l	Pump	Spl-Pres	Gear	Dual	Spld'rf	Hand	Rayfield	Grav	Yes	Elec	Westing'se
Marion, G	6	3.750x5.000	33.75	332.4	L-Head	Threes	Right	Hel'l	Pump	Spl-Pres	Gear	Dual	Spld'rf	Hand	Rayfield	Pres	Yes	Elec	Westing'se
Marmon, 32,	4	4.500x5.000	32.40	318.1	T-Head	Pairs	Opp	Hel'l	Pump	Pres	Gear	2-Pt	Bosch	Hand	Zenith	Pres	Yes	Elec	Northeast
Marmon, 48,	6	4.500x6.000	48 60	577.5	T-Head	Pairs	Opp	Hel'l	Pump	Pres	Gear	2-Pt	Bosch	Hand	Zenith	Pres	Yes	Elec	Northeast
Marmon, 41	6	4.250x5.500	43.80	468.0	L-Head	Threes	Right	Hel'l	Pump	Pres	Gear	Dual	Bosch	Hand	Zenith	Pres	Yes	Elec	Northeast
Maxwell, 25-4	4	3.625x4.500	20.25	185.8	L-Head	Block	Right	Hel'l	Thermo	Splash	Piston	Sing	Simms	Hand	Zephyr	Grav	Yes		
Maxwell, 35-4	4	4.000x4.750	25.60	238.8	L-Head	Block	Left	Hel'l	Pump	Splash	Vacuum	Dual	Spld'rf	Hand	Holley	Grav	Yes	Elec	Deaco
Maxwell, 50-6	6	4.125x4.750	40.90	380.4	L-Head	Block	Opt	Hel'l	Pump	Splash	Gear	Dual	Spld'rf	Hand	Rayfield	Pres	Yes	Elec	Gray & Davis
McFarlan, T	6	4.000x6.000	38.40	452.4	T-Head	Block	Opp	Hel'l	Pump	Splash	Noncir	Sing	Mea	Hand	Stromberg	Pres	Yes	Air	Own
Mercer, 35-J	4	4.375x5.000	30.63	300.7	T-Head	Pairs	Opp	Hel'l	Pump	Splash	Rotary	2-Pt	Bosch	Hand	Fletcher	Pres	No		
Mercer, 35-M	4	4.500x5.000	32.40	318.1	T-Head	Pairs	Opp	Hel'l	Pump	Splash	Rotary	2-Pt	Bosch	Hand	Fletcher	Pres	No	Elec	Rushmore
Mercer, 35-H & O	4	4.500x5.000	32.40	318.1	T-Head	Pairs	Opp	Hel'l	Pump	Splash	Rotary	2-Pt	Bosch	Hand	Fletcher	Pres	No	Elec	Rushmore
Meteor, M-36	4	4.000x5.000	25.60	251.3	L-Head	Pairs	Left	Hel'l	Pump	Spl-Pres	Gear	Sing	Remy	Hand	Stromberg	Grav	Yes	Elec	Jesco Ex
Meteor, F-40	4	4.000x5.000	25.60	251.3	L-Head	Pairs	Left	Hel'l	Pump	Spl-Pres	Gear	Sing	At Kent	Hand	Stromberg	Grav	Yes	Elec	Jesco
Meteor, W-6-45	6	3.750x5.000	33.60	331.4	L-Head	Pairs	Left	Hel'l	Pump	Spl-Pres	Gear	Sing	At Kent	Hand	Stromberg	Grav	Yes	Elec	Jesco
Metropol, C	4	4.250x7.875	28.90	446.8	T-Head	Block	Opp	Hel'l	Pump	Spl-Pres	Gear	Dual	Bosch	Hand	Optional	Pres	No	Mech	Ev'r R'dy Ex
Metz	4	3.750x4.000	22.50	176.7	L-Head	Block	Right	Gear	Thermo	Splash	Gear	Sing	Bosch	Hand	Holley	Grav		Elec	Northeast Ex
Mitchell, Four	4	4.250x7.000	28.90	397.2	T-Head	Pairs	Opp	Hel'l	Pump	Spl-Pres	Piston	Dual	Remy	Hand	Rayfield	Grav	Yes	Elec	Remy
Mitchell, Little Six	6	4.250x6-7	43.80		T-Head	Pairs	Opp	Hel'l	Pump	Spl-Pres	Piston	Dual	Remy	Hand	Rayfield	Grav	Yes	Elec	Remy
Mitchell, Big Six	6	4.250x7.000	43.80	595.8	T-Head	Pairs	Opp	Hel'l	Pump	Spl-Pres	Piston	Dual	Remy	Hand	Rayfield	Grav	Yes	Elec	Remy
Moline-Knight, 26-50	4	4.000x6.000	25.60	301.6	Knight	Block	Sleeve	Chain	Thermo	Pres	Gear	Doub	Bosch	Hand		Pres	Yes	Elec	Wagner
Monarch, 4	4	3.190x5.000	16.27	159.6	L-Head	Block		Gear	Thermo	Splash		Dual	Spld'rf	Hand	Zephyr			Elec	Deaco Ex
Mondex Magic, 6-40	6	3.375x4.750	27.40	255.0	Special	Threes		Chain	Pump	Spl-Pres	Gear	Dual	Bosch	Hand	C. R. G	Pres	No	Elec	Westing'se
Mondex Magic, 6-60	6	4.000x5.625	38.40	424.2	Special	Threes		Chain	Pump	Spl-Pres	Gear	Dual	Bosch	Hand	C. R. G	Pres	No	Elec	Westing'se
Moon, 42	4	4.500x5.000	32.40	318.1	T-Head	Pairs	Opp	Hel'l	Pump	Splash	Gear	Dual	Delco	Auto	Stromberg	Pres	Yes	Elec	Delco
Moon, 6-50	6	3.750x5.250	33.75	347.8	L-Head	Threes	Right	Hel'l	Pump	Spl-Pres	Gear	Dual	Delco	Auto	Stromberg	Pres	Yes	Elec	Delco
Morse, D	4	4.625x5.000	34.25	336.0	I-Head	Sep	Head	Spur	Pump	Splash	Gear	Dual	Eisemann	Hand	Stromberg	Grav	Yes	Elec	Gray & Davis
Moyer, E	4	4.500x5.000	32.40	318.1	T-Head	Pairs	Opp	Hel'l	Pump	Pres	Gear	Sing	Mea	Hand	Carter	Grav	No	Elec	U. S. L
Moyer, G	6	4.500x5.000	48.60	577.1	T-Head	Pairs	Opp	Hel'l	Pump	Pres	Gear	Sing	Mea	Hand	Carter	Grav	No	Elec	U. S. L
National, 40	4	4.875x6.000	38.00	448.0	T-Head	Pairs	Opp	Hel'l	Pump	Spl-Pres	Gear	2-Pt	Bosch	Hand	Rayfield	Pres		Elec	Gray & Davis
National, Six	6	3.750x5.500	33.75	364.4	L-Head	Block	Right	Hel'l	Pump	Spl-Pres	Gear	Dual		Hand		Pres	Yes	Elec	Deaco
Norwalk, D**	6	3.875x5.000	36.06	353.7	T-Head	Threes	Opp	Hel'l	Pump	Splash	Cent	Sing	At Kent	H & A	Rayfield	Pres	Yes	Elec	Westing'se
Norwalk, C**	6	4.000x5.500	38.40	414.8	T-Head	Threes	Opp	Hel'l	Pump	Splash	Cent	Sing	At Kent	H & A	Rayfield	Pres	Yes	Elec	Westing'se
Oakland, 36	4	3.500x5.000	19.60	192.4	L-Head	Block	Left	Hel'l	Pump	Splash	Piston	Dual	Delco	Hand	Holley	Pres	Yes	Elec	Delco
Oakland, M-48	6	3.560x5.000	29.40	288.6	L-Head	Block	Left	Hel'l	Pump	Splash	Piston	Dual	Delco	Hand	Stromberg	Pres	Yes	Elec	Delco
Ohio, Ohio	4	4.250x4.750	28.90	269.4	T-Head	Pairs	Opp	Hel'l	Pump	Splash	Piston	Dual	Spld'rf	Hand	Optional	Grav	No	Elec	Jesco
Ohio, Royal	6	4.000x6.000	38.40	452.4	T-Head	Block	Opp	Hel'l	Pump	Splash	Piston	Dual	Spld'rf	Hand	Optional	Grav		Elec	Jesco
Oldsmobile, D-54	6	4.250x5.250	43.80	446.7	L-Head	Pairs	Left	Chain	Pump	Splash	Piston	Sing	Delco	Auto	Stromberg	Pres	Yes	Elec	Delco
Overland, 79	4	4.125x4.500	27.25	240.5	L-Head	Sep	Left	Hel'l	Thermo	Splash	Gear	Dual	Spld'rf	Hand	Schebler	Grav	Yes	Elec	Gray & Davis Ex
Packard, 238	6	4.000x5.500	38.40	414.7	L-Head	Threes	Right	Hel'l	Pump	Spl-Pres	Gear	Dual	Bosch	Hand	Own	Pres	Yes	Elec	Bijur
Paige, 25	4	3.750x4.000	22.50	176.7	L-Head	Block	Left	Hel'l	Thermo	Splash	Piston	Sing	Bosch	Hand	Mayer	Grav	Yes	Elec	Disco
Paige, 36	4	4.000x5.000	25.60	251.3	L-Head	Block	Left	Chain	Pump	Spl-Pres	Piston	Sing	Bosch	Hand	Stewart	Grav	No.	Elec	Gray & Davis

**Has Underslung Frame.

ABBREVIATIONS:—Cylinders: Sep., separate. **Valve Location:** Opp., opposite; Head, both valves in the head; S. & H., side and head. **Cooling:** Thermo, thermo-syphon. **Lubrication:** Spl-pres, splash pressure; Pres, pressure; Flyw'l, flywheel; Cent, centrifugal; Ecc, ecentric. **Ignition:** Sing, single; Dup'x, duplex, Doub., double; 2-Pt., two-point; Ex., extra; Westing'se, Westinghouse; Spld'rf, Splitdorf; At Kent Atwater Kent; Nat'l, National; Connect, Connecticut; Mich., Michigan; H. & A., hand and automatic; Auto, automatic. **Fuel Feed:** Grav., gravity; Pres, pressure; Grav. P., pressure and gravity **Cranking System:** Elec., electric; Mech., mechanical; Acet, acetylene; Ex., extra.

Carbureters, Starters, Magnetos, Etc. for 1914—Continued

Lighting System	TRANSMISSION: Clutch Type	GEARSET: Type	GEARSET: Location	GEARSET: Forward Speeds	Final Drive	Car Drives Through	Rear Axle	Total Gear Ratio on Direct	RUNNING GEAR: Wheelbase	TIRES: Front	TIRES: Rear	Wheels	Rear Springs	CONTROL: Location Steering Wheel	CONTROL: Gearshift Location	BEARINGS: Crankshaft Type and No.	BEARINGS: Gearset	BEARINGS: Rear Axle	BEARINGS: Front Wheel	MAKE AND MODEL
Rushmore	Cone	Sel	Amid	4	Bevel	Springs	Float	4.00-1	125	34x4	34x4	Wood	½ Ell	Right	Right	Plain, 5	Ball	Ball	Roll	Klinekar, 4-30
Rushmore	Cone	Sel	Amid	4	Bevel	Springs	Float	3.70-1	120	36x4	36x4	Opt	½ Ell	Left	Cent	Plain, 5	Ball	Ball	Ball	Klinekar, 4-40
Rushmore	Cone	Sel	Amid	4	Bevel	Springs	Float	3.70-1	128	37x4½	37x4½	Opt	½ Ell	Left	Cent	Ball, 7	Ball	Ball	Ball	Klinekar, 6-50
Rushmore	Cone	Sel	Amid	4	Bevel	Springs	Float	3.70-1	133	37x5	37x5	Wood	½ Ell	Left	Cent	Ball, 7	Ball	Ball	Ball	Klinekar, 6-60
Esterline	Disk	Sel	Unit M.	3	Bevel	Rad Rd	Float	3.30-1	117-22	36x4½	36x4½	Wood	½ Ell	Right	Cent	Plain, 5	Ball	Ball	Roll	Knox, 44
Esterline	Disk	Sel	Unit M.	3	Bevel	Rad Rd	Float	3.30-1	126	37x5	37x5	Wood	½ Ell	Opt	Cent	Plain, 5	Ball	Ball	Roll	Knox, 45
Esterline	Disk	Sel	Unit M.	3	Bevel	Springs	Float	3.50-1	134	38x5	38x5	Wood	½ Ell	Opt	Cent	Plain, 4	Ball	Ball	Roll	Knox, 46
Esterline	Disk	Sel	Unit M.	3	Bevel	Rad Rd	Float	3.00-1	134	38x5½	38x5½	Wood	½ Ell	Opt	Cent	Plain, 4	Ball	Ball	Roll	Knox, 66
Battery	Disk	Sel	Unit M	3	Bevel	Tor T	Semi F	4.00-1	108	32x3½	32x3½	Wood	Ell	Left	Left	Ball, 2	P&B	Roll	Ball	Krit, L
Briggs		Fric	Amid		Chain	Rad Rd	Semi F	3.60-1	112	32x3½	32x3½	Wood	Ell	Left	Cent	Plain, 3		Roll	Ball	Lambert, 46
Disco		Fric.	Amid		Chain	Rad Rd	Semi F	3.60-1	115	34x3½	34x3½	Wood	Ell	Right	Right	Plain, 3		Roll	Ball	Lambert, 60
Gray & Davis	Cone	Sel	Unit X.	3	Bevel	Tor T	¾ Float		118	34x4½	34x4½	Wood	½ Ell	Left	Cent	Plain, 3	Ball	Ball	Ball	Lenox, 4
Gray & Davis	Cone	Sel	Unit X.	3	Bevel	Tor T	¾ Float		130	34x4½	34x4½	Wood	½ Ell	Left	Cent	Plain, 3	Ball	Ball	Ball	Lenox, 6
	Disk	Sel	Unit M.	3	Bevel	Springs	Float	3.75-1	135	36x4	36x4	Wood	½ Ell	Left	Cent	Plain, 3	Ball	Ball	Ball	Lewis, Six
Gray & Davis	Disk	Sel	Amid	4	Bevel	Rad Rd	Float	3.54-1	132-28	36x5	36x5	Wood	½ Ell	Opt	Opt	Plain, 7	Ball	Ball	Roll	Locomobile, 38-LD&RD
Gray & Davis	Disk	Sel	Amid	4	Bevel	Rad Rd	Float	3.54-1	140	36x5	37x5½	Wood	½ Ell	Left	Cent	Plain, 7	Ball	Ball	Roll	Locomobile, 48-LD
Gray & Davis	Disk	Sel	Amid	4	Bevel	Rad Rd	Float	3.54-1	136	36x4½	37x5	Wood	½ Ell	Right	Right	Plain, 7	Ball	Ball	Roll	Locomobile, 48-RD
Gray & Davis	Disk	Sel	Unit M.	3	Bevel	Springs	Float	3.75-1	127½	36x4½	36x4½	Wood	Plat	Left	Cent	Plain, 3	Ball	Ball	Ball	Lozier, 77
Gray & Davis	Disk	Sel	Unit M.	4	Bevel				120	36x4½	36x4½	Wood		Left	Cent					Lozier, Four
Vesta	Disk	Sel	Unit M.	3	Bevel	Rad Rd	Float	3.75-1	130	36x4½	36x4½	Wood	Ell	Left	Cent	Plain, 5	Ball	B&R	Roll	Luverne, 7-60
Northeast	Disk	Sel	Unit X.	3	Worm	Tor T	Float	3.85-1	130	37x5	37x5	Wood	½ Ell	Left	Cent	Plain, 5	Ball	Roll	Roll	Lyons-KnightK-4,
Jesco Ex	Disk	Sel	Unit M	3	Bevel	Springs	Semi F	4.00-1	104	32x3½	32x3½	Wood	Ell	Right	Right	Plain, 3	Ball	Roll	Ball	Marathon, Runner
Jesco	Disk	Sel	Unit M.	3	Bevel	Springs	Float	4.00-1	118	34x4	34x4	Wood	Ell	Right	Right	Plain, 3	Ball	Roll	Ball	Marathon, Winner
Apico	Disk	Sel	Unit M.	3	Bevel	Springs	Float	4.00-1	126	36x4	36x4	Wood	Ell	Right	Right	Plain, 3	Ball	Roll	Ball	Marathon, Champion
Westing'se	Cone	Sel	Unit X.	3	Bevel	Tor T	Float	3.70-1	117	34x4	34x4	Wood	½ Ell	Left	Cent	Plain, 3	Ball	B&R	Ball	Marion, B
Westing'se	Disk	Sel	Unit X	3	Bevel	Tor T	Float	3.70-1	124	35x4½	35x4½	Wood	½ Ell	Left	Cent	Plain, 3	Roll	B&R	Ball	Marion, G
Northeast	Cone	Sel	Unit X	3	Bevel	Tor T	Semi F	3.40-1	120	35x4½	35x4½	Wood	Ell	Left	Cent	Plain, 3	Ball	B&R	Roll	Marmon, 32
Northeast	Disk	Sel	Unit X.	3	Bevel	Tor T.	Semi F	3.46-1	145	36x4½	37x5	Wood	½ Ell	Left	Cent	Plain, 7	Ball	B&R	Roll	Marmon, 48
Northeast	Cone	Sel	Amid	3	Bevel	Tor R	Float	3.60-1	132	35x5	35x5	Wood	½ Ell	Left	Cent	Plain, 7	Roll	Roll	Roll	Marmon, 41
	Cone	Sel	Amid	3	Bevel	Springs	¾ Float	3.58-1	103	30x3½	30x3½	Wood	½ Ell	Left	Cent	Plain, 2	P&R	Roll	Ball	Maxwell, 25-4
Deaco	Cone	Sel	Unit X.	3	Bevel	Tor T	Semi F	3.53-1	110	33x4	33x4	Wood	½ Ell	Left	Cent	Plain, 3	Roll	Roll	Ball	Maxwell, 35-4
Gray & Davis	Cone	Sel	Unit X.	3	Bevel	Tor T	Float	3.69-1	130	36x4½	36x4½	Wood	½ Ell	Opt	Opt	Plain, 3	Roll	Roll	Roll	Maxwell, 50-6
Vesta	Disk	Sel	Unit X.	3	Bevel	Tor T	Float	3.50-1	128	36x4½	36x4½	Wood	½ Ell	Left	Cent	Plain, 4	Roll	B&R	Ball	McFarlan, T
	Disk	Sel	Amid	4	Bevel	Rad Rd	Float	2.52-1	108	32x4	32x4	Wood	½ Ell	Right	Right	Plain, 3	Ball	Ball	Ball	Mercer, 35-J
Rushmore	Disk	Sel	Amid	4	Bevel	Rad Rd	Float	3.00-1	124	34x4	35x4½	Wood	½ Ell	Right	Right	Plain, 3	Ball	Ball	Ball	Mercer, 35-M
Rushmore	Disk	Sel	Amid	4	Bevel	Rad Rd	Float	2.82-1	118	34x4	34x4	Wood	½ Ell	Right	Right	Plain, 3	Ball	Ball	Ball	Mercer, 35-H & O
Jesco Ex	Disk	Sel	Unit M.	3	Bevel	Tor T	¾ Float	3.75-1	116	34x3½	34x3½	Wood	½ Ell	Right	Cent	Plain, 3	Ball	Roll	Ball	Meteor, M-36
Jesco	Disk	Sel	Unit M.	3	Bevel	Tor T	¾ Float	3.75-1	118	34x3½	34x3½	Wood	½ Ell	Right	Cent	Plain, 3	Ball	Roll	Ball	Meteor, F-40
Jesco	Disk	Sel	Unit M.	3	Bevel	Tor T	¾ Float	3.75-1	122	35x4	35x4	Wood	½ Ell	Right	Cent	Plain, 3	Ball	Roll	Ball	Meteor, W-6-45
	Cone	Sel	Amid	3	Bevel	Tor T	Float	2.50-1	115	33x4	33x4	Wood	½ Ell	Right	Right	B&P, 3	Ball	Ball	Ball	Metropol, C
Northeast Ex		Fric			Chain		Dead		90	30x3	30x3	Wood	Ell	Left	Cent	Plain, 3	Ball	Ball	Ball	Metz
Remy	Cone	Sel	Amid	3	Bevel	Tor T	Float	3.35-1	120	36x4½	36x4½	Wood	½ Ell	Left	Cent	Plain, 3	B&R	B&R	Roll	Mitchell, Four
Remy	Cone	Sel	Amid	3	Bevel	Tor T	Float	3.35-1	132	36x4½	36x4½	Wood	½ Ell	Left	Cent	Plain, 4	B&R	B&R	Roll	Mitchell, Little Six
Remy	Cone	Sel	Amid	3	Bevel	Tor T	Float	3.35-1	144	37x5	37x5	Wood	½ Ell	Left	Cent	Plain, 4	B&R	B&R	Roll	Mitchell, Big Six
Wagner	Cone	Sel	Unit M	3	Bevel	Tor T	Float	4.25-1	128	36x4½	36x4½	Wood	½ Ell	Left	Cent	Plain, 3	Roll	Ball	Ball	Moline-Knight, 26-50
Deaco Ex	Cone	Sel		3	Bevel				110	32x3½	32x3½		Ell	Left	Cent					Monarch, 4
Westing'se	Disk	Sel	Amid	4	Bevel	Springs	Float	3.66-1	134	36x4½	36x4½	Wire	½ Ell	Left	Cent	Plain, 7	Ball	Roll	Roll	Mondex Magic, 6-40
Westing'se	Disk	Sel	Amid	4	Bevel	Springs	Float	3.66-1	140	37x5	37x5	Wire	½ Ell	Left	Cent	Plain, 7	Ball	Roll	Roll	Mondex Magic, 6-60
Delco	Disk	Sel	Amid	3	Bevel	Springs	Float	3.50-1	118	34x4	34x4	Wood	½ Ell	Left	Cent	Plain, 3	Ball	B&R	Roll	Moon, 42
Delco	Disk	Sel	Unit M	4	Bevel	Springs	Float	3.80-1	129	35x4½	35x4½	Wood	½ Ell	Left	Cent	Plain, 3	Roll	B&R	Roll	Moon, 6-50
Gray & Davis	Disk	Sel	Amid	4	Bevel	Tor T	¾ Float	3.38-1	127	36x4½	36x4½	Wood	Ell	Right	Right	Plain, 5	Ball	Ball	Ball	Morse, D
U. S. L.	Cone	Sel	Amid	3	Bevel	Rad Rd	Float	3.50-1	121	34x4	34x4	Wood	½ Ell	Right	Right	Plain, 3	Roll	Ball	Roll	Moyer, E
U. S. L.	Cone	Sel	Amid	3	Bevel	Rad Rd	Float	3.36-1	135	35x4½	35x4½	Wood	½ Ell	Right	Right	Plain, 3	Roll	Ball	Roll	Moyer, G
Gray & Davis	Cone	Sel	Amid	3	Bevel	Springs	Float	3.00-1	120-28	36x4½	36x4½	Wood	½ Ell	Left	Cent	Plain, 3	Ball	Roll	Roll	National, 40
Deaco	Cone	Sel	Amid	3	Bevel	Springs	Float	4.00-1	132	36x4½	36x4½	Wood	Cant	Left	Cent	Plain, 4	Ball	Roll	Roll	National, Six
Westing'se	Disk	Sel	Unit M.	4	Bevel	Springs	Float	3.80-1	131	37x4	37x4	Opt	½ Ell	Left	Elec	Plain, 3	Ball	Ball	Ball	Norwalk, D**
Westing'se	Disk	Sel	Unit M.	4	Bevel	Springs	Float	3.80-1	136	39x5	39x5	Wood	½ Ell	Left	Elec	Plain, 3	Ball	Ball	Ball	Norwalk, C**
Delco	Cone	Sel	Unit M.	3	Bevel	Springs	Semi F	3.50-1	112	33x4	33x4	Wood	½ Ell	Left	Cent	Plain, 3	B&R	Roll	Ball	Oakland, 36
Delco	Cone	Sel	Unit M.	3	Bevel	Tor R	Float	3.50-1	123½	35x4½	35x4½	Wood	½ Ell	Left	Cent	Plain, 4	B&R	Roll	Ball	Oakland, M-48
Jesco	Disk	Sel	Unit M.	3	Bevel	Springs	Semi F	4.00-1	116	34x4	34x4	Wood	½ Ell	Right	Cent	Plain, 3	B&R	Roll	Ball	Ohio, Ohio
Jesco	Disk	Sel	Unit M.	4	Bevel	Springs	Float	3.50-1	132	35x4½	35x4½	Wood	½ Ell	Left	Cent	Plain, 4	B&R	Ball	Ball	Ohio, Royal
Delco	Cone	Sel	Unit M.	3	Bevel	Springs	Float	3.80-1	132-39	36x5	36x5	Opt	½ Ell	Right	Right	Plain, 4	Ball	Ball	Roll	Oldsmobile, D-54
Gray & Davis Ex	Cone	Sel	Unit X.	3	Bevel	Tor T	¾ Float		114	33x4	33x4	Wood	½ Ell	Right	Cent	Plain, 5	Ball	Roll	Roll	Overland, 79
Bijur	Disk	Prog	Unit X.	3	Worm B.	Rad Rd	Semi F		140	36x4½	37x5	Wood	½ Ell	Left	Left	Plain, 7	Ball	Ball	Roll	Packard, 238
Disco	Disk	Sel	Unit M.	3	Bevel	Rad Rd	Semi F	4.00-1	110	32x3½	32x3½	Wood	Ell	Right	Right	Plain, 2	B&R	Roll	Ball	Paige, 25
Gray & Davis	Disk	Sel	Unit M.	3	Bevel	Rad Rd	¾ Float	3.79-1	116	34x4	34x4	Wood	Ell	Left	Cent	Plain, 3	B&R	B&R	Ball	Paige, 36

ABBREVIATIONS:—**Clutch Type:** Exp. Bd., expanding band; Con. Bd., contracting band. **Gearset:** Sel., selective; Prog., progressive; Plan., planetary; Fric., friction; Unit M, unit with the motor; Unit X, unit with the rear axle; Amid., amidships. **Drive:** Bevel, shaft with bevel gears in rear axle; Worm, shaft with worm gears in rear axle; Worm B, shaft with worm bevel gears in rear axle. **Car Drives Through:** Tor. T., torsion tube; Tor. R., torsion rod; Rad. Rd., radius rods; TTRR., torsion tube and radius rods. **Rear Axle:** Float, floating; Semi F., semi-floating; ¾ Float., three-quarter floating. **Gear Ratio:*** two speed rear axle. **Wheels:** Opt., optional. **Springs:** Ell., elliptic; ½ Ell., semi-elliptic; ¾ Ell, three-quarter elliptic; Plat., platform. **Gearshift:** Elec., electrically operated; **Bearings:** Roll., roller; B. & R., ball and roller; B. & P., ball and plain; B. R. & P., ball, roller and plain.

Specifications of American Pleasure Cars, Including Horsepower,

MAKE AND MODEL	No. of Cylinders	Bore and Stroke, Inches	S. A. E. H. P.	Piston Displacement Cubic Inches	CYLINDERS		Valve Location	Camshaft Drive	Cooling Circulation	LUBRICATION		IGNITION			CARBURETION			CRANKING SYSTEM	
					Shape	How Cast				System	Type of Pump	System	Make	Control	Make of Carbureter	Fuel Feed	Is Hot Air Pipe Fitted?	Type	Make
Palmer-Singer	6	4.000x5.000	38.40	376.9	T-Head	Threes	Opp	Hel'l	Pump	Splash	Gear	Dual	Eisemann	Hand	C. R. G	Pres	No	Elec	Westing'se
Palmer-Singer, 50.	6	4.000x5.500	38.40	414.7	T-Head	Threes	Opp	Hel'l	Pump	Splash	Gear	Dual	Eisemann	Hand	C. R. G	Pres	No	Elec	Westing'se
Partin-Palmer, 38	4				I-Head	Block	Head	Hel'l	Thermo	Splash	Gear	Dual	Briggs	Hand	Stromberg	Grav	Yes	Elec	AutoliteEx
Paterson, 33	4	3.500x5.000	19.60	192.4	L-Head	Block	Left	Hel'l	Pump	Spl-Pres	Piston	Doub	Connect	Hand	Marvel	Grav	Yes	Elec	Autolite
Pathfinder 14	4	4.125x5.250	27.25	280.6	L-Head	Block	Left	Hel'l	Thermo	Pres	Piston	Dual	Eisemann	Hand	Schebler	Grav P	Yes	Elec	Gray & Davis
Pathfinder, Daniel Boone	6	3.750x5.250	33.75	347.8	L-Head	Threes	Side		Pump	Spl-Pres	Gear			Hand	Schebler	Grav	Yes	Elec	Gray & Davis
Pathfinder, Leather Stock'g	6	4.125x5.250	40.90	420.9	L-Head	Threes	Right	Hel'l	Pump	Spl-Pres	Piston	Sing	Mea	Hand	Schebler	Grav	Yes	Elec	Gray & Davis
Peerless, 38-6	6	4.000x5.500	38.40	414.7	T-Head	Pairs	Opp	Hel'l	Pump	Splash	Piston	Dual	Bosch	Hand	Own	Pres	No	Elec	Gray & Davis
Peerless, 48-6	6	4.500x6.000	48.60	577.5	T-Head	Pairs	Opp	Hel'l	Pump	Splash	Piston	Dual	Bosch	Hand	Own	Pres	No	Elec	Gray & Davis
Peerless, 66	6	5.000x7.000	60.00	824.8	T-Head	Pairs	Opp	Hel'l	Pump	Splash	Piston	Dual	Bosch	Hand	Own	Pres	No	Elec	Gray & Davis
Pierce-Arrow, 38 C-2	6	4.000x5.500	38.40	414.7	T-Head	Pairs	Opp	Hel'l	Pump	Pres	Gear	Doub	Bosch	Hand	Own	Grav	Yes	Elec	Pierce-West
Pierce-Arrow, 48 B-2	6	4.500x5.500	48.60	529.8	T-Head	Pairs	Opp	Hel'l	Pump	Pres	Gear	Doub	Bosch	Hand	Own	Grav	Yes	Elec	Pierce-West
Pierce-Arrow, 66 A-2	6	5.000x7.000	60.00	824.8	T-Head	Pairs	Opp	Hel'l	Pump	Pres	Gear	Doub	Bosch	Hand	Own	Grav	Yes	Elec	Pierce-West
Pilot, 50	4	4.500x6.000	32.40	381.7	T-Head	Block	Opp	Hel'l	Pump	Splash	Noncir	Dual	Eisemann	Hand	Optional	Grav	Yes	Elec	Gray &Davis
Pilot, 60	6	4.000x6.000	38.40	452.4	T-Head	Block	Opp	Hel'l	Pump	Splash	Noncir	Dual	Eisemann	Hand	Optional	Grav	Yes	Elec	Gray & Dav s
Pope-Hartford, 35	4	4.315x5.250	29.76	299.4	I-Head	Pairs	Head	Hel'l	Pump	Spl-Pres		Dual	Bosch	Hand	Own	Pres	Yes	Elec	Gray & Davis
Pratt, 4-50	4	4.500x5.750	32.40	365.8	L-Head	Pairs	Left	Hel'l	Pump	Splash	Piston	Dual	Bosch	Hand	Holley	Grav	Yes	Elec	Grav & Davis
Premier Six	6	3.625x5.500	31.60	340.7	I-Head	Block	Head	Hel'l	Pump	Spl-Pres	Gear	Sing	Eisemann	Hand	Carter	Pres	Yes	Elec	Remy
Premier, 6-48	6	4.000x5.500	38.40	414.7	T-Head	Threes	Opp	Hel'l	Pump	Spl-Pres	Gear	Sing	Eisemann	Hand	Carter	Pres	Yes	Elec	Remy
Pullman, 4-36	4	4.063x5.000	27.10	265.7	T-Head	Pairs	Opp	Hel'l	Pump	Splash	Ecc	Dual	Bosch	Hand	Stromberg	Grav	No	Elec	Westing'se
Pullman, 4-44	4	4.375x5.500	30.63	330.7	T-Head	Pairs	Opp	Hel'l	Pump	Splash	Ecc	Dual	Bosch	Hand	Stromberg	Grav	No	Elec	Westing'se
Pullman, 6-46	6	3.750x5.250	33.75	347.8	L-Head	Threes	Right	Hel'l	Pump	Spl-Pres	Gear	Dual	Bosch	Hand		Grav	Yes	Elec	Westing'se
Pullman, 6-66	6	4.375x5.500	45.95	496.0	T-Head	Pairs	Opp	Hel'l	Pump	Splash	Ecc	Dual	Bosch	Hand	Stromberg	Grav	No	Elec	Westing'se
Rayfield, D	6	4.000x5.500	38.40	414.7	L-Head	Block	Left	Chain	Thermo	Pres	Gear	Sing	Mea	Hand	Rayfield	Pres	Yes	Elec	Undecided
Read, 30	4	3.500x4.000	19.60	153.9	L-Head	Block	Left	Hel'l	Thermo	Splash	Piston	Sing	Bosch	Fixed	Stromberg	Grav		Opt., Ex.	Opt Ex
Regal, T, N, NC**	4	3.750x4.500	22.50	198.8	L-Head	Block	Left	Hel'l	Thermo	Spl-Pres	Piston	Dual	Mich	Hand	Schebler	Grav	No	Elec	Rushmore
Regal, C**	4	4.000x5.000	25.60	251.3	L-Head	Block	Left	Hel'l	Thermo	Spl-Pres	Piston	Dual	Mich	Hand	Schebler	Grav	No	Elec	Rushmore
Reo, Fifth	4	4.000x4.500	25.60	226.2	L-Head	Pairs	S & H	Hel'l	Pump	Spl-Pres	Piston	Dual	Remy	Hand	Holley	Grav	Yes	Elec	Remy
Republic, E	6	4.250x5.000	43.80	425.4	T-Head	Pairs	Opp	Hel'l	Pump	Spl-Pres	Gear	Dual	Delco	Hand	Carter	Pres	No	Elec	Delco
Richmond, R	4	4.125x5.000	27.25	267.3	L-Head	Block	Left	Hel'l	Pump	Splash	Gear	Dual	Mich	Hand	Kingston	Grav	Yes	Elec	Jesco
Richmond, S	4	4.500x5.000	32.40	318.1	L-Head	Sep	Left	Hel'l	Pump	Splash	Gear	Dual	Mich	Hand	Kingston	Grav	Yes	Elec	Jesco
Richmond, T	6	4.000x4.500	38.40	339.3	L-Head	Sep	Left	Hel'l	Pump	Splash	Gear	Dual	Mich	Hand	Kingston	Grav	Yes	Elec	Jesco
Saxon, A	4	2.625x4.000	11.00	87.4	L-Head	Block	Right	Hel'l	Thermo	Splash		Sing	Atw-Kent	Hand	Mayer	Grav	Yes		
Selden, 49	4	4.750x5.000	36.10	354.4	L-Head	Pairs	Left	Hel'	Pump	Splash	Gear	Doub	Bosch	Hand	Stromberg	Grav	No	Elec	Gray & Davis
S. G. V., F.	4	3.750x6.000	22.50	265.0	L-Head	Block	Right	Gear	Pump	Pres	Gear	Sing	Bosch	Hand	Zenith	Pres	Yes	Elec	U. S. L.
Simplex, 38	4	4.875x6.500	38.00	485.3	T-Head	Pairs	Opp	Spur	Pump	Spl-Pres	Gear	Dual	Bosch	Hand	Own	Pres	Yes	Elec	Rushmore
Simplex, 75	4	5.375x6.500	46.00	590.0	T-Head	Pairs	Opp	Spur	Pump	Spl-Pres	Gear	2-Pt	Bosch	Hand	Own	Pres	Yes	Elec	Rushmore
Simplex, 50	4	5.375x6.500	46.00	590.0	T-Head	Pairs	Opp	Spur	Pump	Spl-Pres	Gear	Dual	Bosch	Hand	Own	Pres	Yes	Elec	Rushmore
S. & M., 14-48	6	3.750x5.250	33.75	347.8	L-Head	Threes	Right	Hel'l	Pump	Splash	Gear	Dual	Bosch	Hand	Rayfield	Pres	Yes	Elec	Rushmore
Spaulding, H.	4	4.250x5.500	28.90	321.0	L-Head	Block	Right	Hel'l	Pump	Splash	Piston	Dual	Simms	Hand	Holley	Grav P	No	Elec	Entz
Speedwell, H	6	4.125x5.250	40.90	420.9	L-Head	Threes	Right	Hel'l	Pump	Splash	Piston	Dual	Bosch	Hand	Stromberg	Pres	Yes	Elec	Wagner
Speedwell, Rotary	6	4.125x5.250	40.90	420.9	Mead	Threes	Opp		Pump	Pres	Gear	Doub	Mea	Hand	Stromberg	Pres	Yes	Elec	Wagner
Spoerer, 40	4	4.875x5.500	38.00	410.6	T-Head	Pairs	Opp		Pump	Pres	Gear	Dual	Bosch	Hand	Stromberg	Pres	No	Elec	Gray & Davis
Staver, 45-A	4	4.500x6.000	32.40	381.7	T-Head	Block	Opp	Hel'l	Pump	Splash	Piston	Dual	Simms	Hand	Rayfield	Pres	Yes	Elec	Esterline
Staver, 65-A	6	4.000x6.000	38.40	452.4	T-Head	Block	Opp	Hel'l	Pump	Splash	Piston	Dual	Simms	Hand	Rayfield	Pres	Yes	Elec	Esterline
Stearns-Knight, Four	4	4.250x5.500	28.90	312.0	Knight	Pairs	Sleeve	Chain	Pump	Spl-Pres	Gear	Dup'x	Bosch	Hand	Stromberg	Pres	Yes	Elec	Gray & Davis
Stearns-Knight, Six	6	4.250x5.750	43.80	489.4	Knight	Pairs	Sleeve	Chain	Pump	Spl-Pres	Gear	Dup'x	Bosch	Hand	Stromberg	Pres	Yes	Elec	Gray & Davis
Stevens-Duryea, C6	6	4.315x5.500	44.88	482.0	L-Head	Pairs	Left	Hel'l	Pump	Sp -Pres	Piston	Doub	Bosch	Hand	Own	Grav	Yes	Air	Own
Studebaker, Four	4	3.500x5.000	19.60	192.4	L-Head	Block	Left	Hel'l	Pump	Splash	Piston	Dual	Remy	Hand	Schebler	Grav	Yes	Elec	Stude-Wag'r
Studebaker, Six	6	3.500x5.000	29.40	288.6	L-Head	Block	Left	Hel'l	Pump	Splash	Piston	Dual	Remy	Hand	Schebler	Grav	Yes	Elec	Stude-Wag'r
Stutz, 4-E	4	4.750x5.500	36.10	389.9	T-Head	Pairs	Opp	Hel'l	Pump	Spl-Pres	Gear	Dual	Spld'rf	Hand	Stromberg	Pres		Elec	Stutz-Remy
Stutz, 4-E	4	4.750x5.500	36.10	389.9	T-Head	Pairs	Opp	Hel'l	Pump	Spl-Pres	Gear	Doub	Spld'rf	Hand	Stromberg	Grav		Elec	Stutz-Remy
Stutz, 6-E	6	4.000x5.000	38.40	376.9	T-Head	Threes	Opp	Hel'l	Pump	Spl-Pres	Gear	Dual	Spld'rf	Hand	Stromberg	Pres		Elec	Stutz-Remy
Stutz, 6-E	6	4.000x5.000	38.40	376.9	T-Head	Threes	Opp	Hel'l	Pump	Spl-Pres	Gear	Doub	Spld'rf	Hand	Stromberg	Grav		Elec	Stutz-Remy
Touraine, 12	6	4.000x5.500	38.40	414.7	T-Head	Threes	Opp	Hel'l	Pump	Splash	Gear	Dual	Bosch	Hand	Fletcher	Pres		Elec	Gray & Davis
Tribune, A	4	4.250x5.500	28.90	312.0	L-Head	Block	Right	Spur	Pump	Spl-Pres	Gear	Dual	Bosch	Hand	Stromberg	Grav	Yes	Elec	Undecided
Vaughan, Six	6	3.750x5.500	33.75	364.4	L-Head	Block	Right	Hel'l	Pump	Spl-Pres		Sing	Mea	Hand	Rayfield	Pres	Yes	Elec	Bijur
Velie, 5	4	4.000x5.500	25.60	276.5	L-Head	Pairs	Left	Chain	Thermo	Splash	Piston	Dual	Bosch	Hand	Stromberg	Grav	Yes	Elec	Gray & Davis
Velie, 9	4	4.625x5.250	34.25	352.8	L-Head	Pairs	Left	Chain	Pump	Splash	Piston	Dual	Bosch	Hand	Stromberg	Pres	Yes	Elec	Gray & Davis
Velie, 10	6	3.750x5.250	33.75	347.8	L-Head	Threes	Right	Hel'l	Pump	Splash	Piston	Dual	Bosch	Hand	Stromberg	Pres	Yes	Elec	Gray & Davis
Vulcan, 27	4	3.375x5.000	18.25	178.9	L-Head	Block	Right	Gear	Thermo	Spl-Pres	Piston	Sing		Fixed		Grav	Yes	Elec	Gray & Davis Ex
White, GAF	4	3.750x5.125	22.50	226.4	L-Head	Block	Right	Hel'l	Pump	Spl-Pres	Gear	Sing	Bosch	Hand	Own	Grav	Yes	Elec	White-Ents
White, GEB	4	4.250x5.750	28.90	326.3	L-Head	Block	Right	Hel'l	Pump	Spl-Pres	Gear	Sing	Bosch	Hand	Own	Grav	Yes	Elec	White-Ents
White, GF	6	4.250x5.750	43.80	489.4	L-Head	Block	Right	Hel'l	Pump	Spl-Pres	Gear	Sing	Bosch	Hand	Own	Grav	Yes	Elec	White-Ents
Willys-Knight, K-17	4	4.000x5.500	25.60	276.5	Knight	Pairs	Sleeve	Chain	Pump	Pres	Piston	Sing	Simms	Hand	S. U	Pres		Elec	U. S. L.
Winton, 20	6	4.500x5.500	48.60	529.8	L-Head	Pairs	Right	Hel'l	Pump	Pres	Piston	Dual	Opt	Hand	Stromberg	Pres	Yes	Air	Own
Zimmerman, D&E	2	4.500x4.000	16.20	127.2	L-Head	Sep	Side		Air	Spl-Pres		Sing	Batt	Hand	Schebler	Grav	No		
Zimmerman, B-6	6	4.000x5.000	38.40	376.9	L-Head	Pairs	Left	Hel'l	Pump	Splash		Dual	Remy	Hand	Schebler	Pres	No	Opt	Opt

**Has Underslung Frame.

ABBREVIATIONS:—Cylinders: Sep., separate. **Valve Location:** Opp., opposite; Head, both valves in the head; S. & H., side and head. **Cooling:** Thermo, thermo-syphon. **Lubrication:** Spl-pres, splash pressure; Pres, pressure; Flyw'l, flywheel; Cent, centrifugal; Ecc, eccentric. **Ignition:** Sing, single; Dup'x, duplex, Doub., double; 2-Pt., two-point; Weating'se, Westinghouse; Spld'rf, Splitdorf; At Kent, Atwater Kent; Nat'l, National; Connect, Connecticut; Mich., Michigan; H. & A., hand and automatic; Auto, automatic. **Fuel Feed:** Grav., gravity; Pres, pressure; Grav. P., pressure and gravity. **Cranking System:** Elec., electric; Mech., mechanical; Acet, acetylene; Ex, extra.

Carbureters, Starters, Magnetos, Etc. for 1914—Continued

Lighting System	TRANSMISSION: Clutch Type	GEARSET: Type	GEARSET: Location	GEARSET: Forward Speeds	TRANSMISSION: Final Drive	TRANSMISSION: Car Drives Through	TRANSMISSION: Rear Axle	TRANSMISSION: Total Gear Ratio on Direct	RUNNING GEAR: Wheelbase	RUNNING GEAR: TIRES Front	RUNNING GEAR: TIRES Rear	RUNNING GEAR: Wheels	RUNNING GEAR: Rear Springs	CONTROL: Location Steering Wheel	CONTROL: Gearshift Location	BEARINGS: Crankshaft Type and No	BEARINGS: Gearset	BEARINGS: Rear Axle	BEARINGS: Front Wheel	MAKE AND MODEL
Westing'se ..	Disk....	Sel ...	Unit X..	3	Bevel...	T T R R ..	Float ...	.....	128	36x4½	36x4½	Wood ..	½ Ell..	Right...	Right.	Plain, 3 .	Ball ..	Ball ..	Ball ..	..... Palmer-Singer
Westing'se ..	Disk....	Sel ...	Unit X..	3	Bevel...	T T R R ..	Float ...	3.75–1	134	36x4½	36x4½	Opt	½ Ell..	Left	Cent..	Plain, 3 .	Ball..	Ball ..	Ball ..	..... Palmer-Singer, 50
Autolite Ex .	Cone ...	Sel ...	Unit X..	3	Bevel...	T T R R...	¾ Float .	3.80–1	115	32x3½	32x3½	Wood ..	½ Ell..	Left	Cent..	Plain, 3 .	Roll ..	Roll ..	Ball ..	..... Partin-Palmer, 38
Autolite	Cone ...	Sel ...	Unit M..	3	Bevel...	Springs....	Float ...	4.00–1	112	32x3½	32x3½	Wood ..	½ Ell..	Left	Cent..	Plain, 3 .	Ball ..	B&R..	Ball ..	..... Paterson, 33
Gray & Davis	Cone ...	Sel ...	Unit M..	3	Bevel...	Tor T	Float ...	4.00–1	120	35x4½	35x4½	Wood ..	½ Ell..	Right...	Right.	Plain, 3 .	Roll ..	B&R..	Roll ..	..... Pathfinder, 14
Gray & Davis	Disk....	Sel ...	Unit M..	3	Bevel...	.....	Float ...	3.75–1	125	34x4½	34x4½	Wood ..	Cant..	Left	Cent..	Plain, 3 .	Ball ..	Ball ..	Roll ..	Pathfinder, Daniel Boone
Gray & Davis	Disk....	Sel ...	Unit M..	4	Bevel...	Tor T.....	Float ...	3.75–1	135	35x5	35x5	Wood ..	½ Ell..	Left	Cent..	Plain, 3 .	Ball ..	Ball ..	Roll ..	Pathfinder, Leather Stock'g
Gray & Davis	Exp Bd..	Sel ...	Amid ...	4	Bevel...	Rad Rd...	Float ...	3.56–1	125	36x4½	36x4½	Wood ..	Plat ..	Opt	Opt ..	Plain, 7 .	Ball ..	B&R..	Roll ..	..... Peerless, 38-6
Gray & Davis	Exp Bd..	Sel ...	Amid ...	4	Bevel...	Rad Rd...	Float ...	3.17–1	137	36x4½	37x5	Wood ..	Plat ..	Opt	Opt ..	Plain, 7 .	Ball ..	B&R..	Roll ..	..... Peerless, 48-6
Gray & Davis	Exp Bd..	Sel ...	Amid ...	4	Bevel...	Rad Rd...	Float ...	2.59–1	140	38x5½	38x5½	Wood ..	Plat ..	Opt	Opt ..	Plain, 7 .	Ball ..	B&R..	Roll ..	..... Peerless, 66
Pierce-West..	Cone ...	Sel ...	Amid ...	4	Bevel...	Springs....	Semi F .	.....	127-32	36x4½	36x4½	Wood ..	½ Ell..	Right...	Right.	Plain, 7 .	Ball ..	B&R..	Roll ..	..... Pierce-Arrow, 38 C-2
Pierce-West..	Cone ...	Sel ...	Amid ...	4	Bevel...	Springs....	Semi-F .	.....	134-42	37x5	37x5	Wood ..	½ Ell..	Right...	Right.	Plain, 7 .	Ball ..	B&R..	Roll ..	..... Pierce-Arrow, 48 B-2
Pierce-West..	Cone ...	Sel ...	Amid ...	4	Bevel...	Springs....	Semi F .	.....	140-47	37x5	38x5½	Wood ..	½ Ell..	Right...	Right.	Plain, 7 .	Ball ..	B&R..	Roll ..	..... Pierce-Arrow, 66 A-2
Gray & Davis	Cone ...	Sel ...	Amid ...	3	Bevel...	Springs...	Float ...	3.50–1	126-20	37x4½	37x4½	Wood ..	½ Ell..	Opt	Cent..	Plain, 3 .	Ball ..	Ball ..	Ball ..	..... Pilot, 50
Gray & Davis	Cone ...	Sel ...	Amid ...	3	Bevel...	Springs....	Float ...	3.50–1	132	37x4½	37x4½	Wood ..	½ Ell..	Opt	Cent..	Plain, 4 .	Ball ..	Ball ..	Ball ..	..... Pilot, 60
Gray & Davis	Cone ...	Sel ...	Amid...	4	Bevel...	S & T T..	Float ...	3.67.1	118½	36x4½	36x4½	Wood ..	½ Ell..	Left. ...	Cent..	Plain, 3.	Roll ..	Roll ..	Roll ..	..... Pope-Hartford, 35
Gray & Davis	Disk....	Sel..	Unit M..	3	Bevel...	Springs....	Float ...	4.00–1	122	36x4	36x4	Wood ..	½ Ell..	Right...	Right.	Plain, 3 .	Roll ..	Roll ..	Roll ..	..... Pratt, 4-50
Remy	Disk....	Sel ...	Unit M..	3	Bevel...	Springs....	Float ...	3.79–1	132	36x4½	36x4½	Wood ..	½ Ell..	Left	Cent..	Plain, 3 .	Roll .	B&R..	Roll ..	..... Premier, Six
Remy	Disk....	Sel ...	Unit M..	3	Bevel...	Springs....	Semi F..	3.79–1	132	36x4½	36x4½	Wood ..	½ Ell..	Left	Cent..	Plain, 3 .	Roll .	B&R..	Roll ..	..... Premier, 6-48
Westing'se ..	Cone ...	Sel ...	Amid ...	3	Bevel...	Springs....	Float ...	3.75–1	118	34x4	34x4	Wood ..	½ Ell..	Opt	Opt ..	Plain, 3 .	Ball ..	Roll ..	Roll ..	..... Pullman, 4-36
Westing'se ..	Cone ...	Sel ...	Amid ...	4	Bevel...	Springs....	Float ...	3.75–1	122	36x4	36x4	Wood ..	½ Ell..	Left	Cent..	Plain, 3 .	Ball ..	Roll ..	Roll ..	..... Pullman, 4-44
Westing'se ..	Disk....	Sel ...	Unit M..	4	Bevel...	Springs....	Float ...	.....	130	36x4½	36x4½	Wire	½ Ell..	Left	Elec ..	Plain, 3 .	Ball ..	Roll ..	Roll ..	..... Pullman, 6-46
Westing'se ..	Cone ...	Sel ...	Amid ...	4	Bevel...	Springs....	Float ...	3.75–1	138	37x5	37x5	Wood ..	½ Ell..	Left	Cent..	Plain, 4 .	Ball ..	Roll ..	Roll ..	..... Pullman, 6-66
Undecided ..	Disk....	Sel ...	Unit M..	4	Bevel...	Rad Rd...	Float ...	3.50–1	130	36x4½	36x4½	Opt	½ Ell..	Right...	Right.	Plain, 4 .	Ball ..	Ball ..	Ball ..	..... Rayfield, D
Acet	Disk....	Sel ...	Unit M..	3	Bevel...	Tor T.....	Semi F .	4.00–1	115	32x3½	32x3½	Wood ..	Ell ...	Left	Cent..	Plain, 2 .	Plain .	Roll ..	Ball ..	..... Read. 30
Rushmore....	Cone ...	Sel ...	Unit X..	3	Bevel...	Rad Rd...	Semi F .	3.23–1	108	32x3½	32x3½	Wood ..	½ Ell..	Left	Cent..	Plain, 2 .	Roll .	Roll ..	Ball ..	..... Regal, T, N, NC**
Rushmore....	Cone ...	Sel ...	Unit X..	3	Bevel...	Rad Rd...	Semi F .	4.08–1	116	34x4	34x4	Wood ..	½ Ell..	Left	Cent..	Plain, 3 .	Roll ..	Roll ..	Ball ..	..... Regal, C**
Remy	Disk....	Sel ...	Amid ...	3	Bevel...	Springs....	Semi F .	3.70–1	112	34x4	34x4	Wood ..	½ Ell..	Left	Cent..	Plain, 3 .	Roll ..	Roll ..	Roll ..	..... Reo, Fifth
Delco.	Cone ...	Sel ...	Amid ...	4	Bevel...	Rad Rd...	Float ...	4.00–1	133	36x4½	36x4½	Wood ..	½ Ell..	Left	Cent..	Plain, 4 .	Ball ..	Ball ..	Ball ..	..... Republic, E
Jesco.....	Cone ...	Sel ...	Amid ...	3	Bevel...	Springs....	Semi F .	4.00–1	114	34x4	34x4	Wood ..	½ Ell..	Right...	Cent..	Plain, 5 .	Ball ..	Ball ..	Ball ..	..... Richmond, R
Jesco	Cone ...	Sel...	Amid ...	3	Bevel...	Springs....	Semi F .	4.00–1	117	34x4	34x4	Wood ..	½ Ell..	Right...	Cent..	Plain, 5 .	Ball ..	Ball ..	Ball ..	..... Richmond, S
Jesco	Cone ...	Sel ...	Amid ...	3	Bevel...	Springs....	Semi F .	Opt ...	123	34x4	34x4	Wood ..	½ Ell..	Right...	Cent..	Plain, 7 .	Ball ..	Ball ..	Ball ..	..... Richmond, T
.....	Disk....	Prog..	Unit X .	2	Bevel ..	Tor T	Semi F .	4.50–1	96	28x3	28x3	Wire....	Cant..	Left	Cent..	Plain, 3.	P & R	P & R	Ball ..	..... Saxon, A
Gray & Davis	Disk....	Sel ...	Amid ...	3	Bevel...	Tor R	¾ Float .	3.50–1	125	36x4	36x4	Wood ..	½ Ell..	Right...	Right	Plain, 3 .	Roll ..	Ball ..	Ball ..	..... Selden, 49
U. S. L.....	Disk....	Sel ...	Unit M .	4	Bevel...	Springs....	Semi F .	4.00–1	120	35x4½	35x4½	Wood ..	½ Ell..	Left	Elec ..	Plain, 3 .	Ball ..	Ball ..	Ball ..	..... S. G. V., F
Rushmore....	Disk....	Sel ...	Amid ...	4	Bevel...	Tor T	Semi F .	2.75–1	137	35x5	35x5	Wood ..	½ Ell..	Right...	Right.	Plain, 3 .	Ball ..	Ball ..	Ball ..	..... Simplex, 38
Rushmore....	Disk....	Sel ...	Amid ...	4	Chain...	Rad Rd...	Dead ...	2.13–1	129	.....	.....	Wood ..	½ Ell..	Right...	Right.	Plain, 3 .	.....	.....	.....	..... Simplex, 75
Rushmore....	Disk....	Sel ...	Amid ...	4	Chain...	Rad Rd...	Dead ...	2.13–1	137	36x4½	37x5	Wood ..	½ Ell..	Right...	Right.	Plain, 3 .	Ball ..	Ball ..	Ball ..	..... Simplex, 50
Rushmore....	Disk....	Sel ...	Unit M..	4	Bevel...	Tor T	Float ...	Opt ...	130	34x4½	34x4½	Wire	½ Ell..	Left	Cent..	Plain, 3 .	Roll ..	Roll ..	Roll ..	..... S. & M., 14-48
Entz	Cone ...	Sel ...	Amid ...	3	Bevel...	Tor T	Float ...	3.75–1	120	36x4	36x4	Wood ..	½ Ell..	Left	Cent..	Plain, 3 .	Ball ..	Roll ..	Roll ..	..... Spaulding, H
Wagner	Disk....	Sel ...	Unit M..	5	Bevel...	Springs....	Float ...	Opt ...	135	37x5	37x5	Wood ..	½ Ell..	Left	Cent..	Plain, 3 .	Ball ..	Roll ..	Roll ..	..... Speedwell, H
Wagner	Disk....	Sel ...	Unit M..	3	Bevel...	Springs....	Float ...	.....	135	37x5	37x5	Wood ..	½ Ell..	Left	Cent..	Plain, 3.	Ball ..	Roll ..	Roll ..	..... Speedwell, Rotary
Gray & Davis	Cone ...	Sel ...	.....	3	Bevel...	T T R R .	Float ...	Opt ...	120	37x4½	37x4½	Wood ..	½ Ell..	Right...	Right.	Plain, 3 .	Ball ..	Roll ..	Roll ..	..... Spoerer. 40
Esterline	Cone ...	Sel ...	Amid ...	3	Bevel...	Springs....	Float ...	3.50–1	120	34x4	34x4	Wood ..	½ Ell..	Left	Cent..	Plain, 3 .	Ball ..	Ball ..	Ball ..	..... Staver, 45-A
Esterline	Cone ...	Sel. ..	Amid ...	4	Bevel...	Springs....	Float ...	3.50–1	138	37x4½	37x4½	Wood ..	½ Ell..	Left	Cent..	Plain, 4 .	Ball ..	Ball ..	Ball ..	..... Staver, 65-A
Gray & Davis	Disk....	Sel ...	Unit M..	3	Bevel...	Springs....	Float ...	3.90–1	121-27	36x4½	36x4½	Wood ..	½ Ell..	Left	Cent..	Plain, 5 .	Ball ..	Roll .	Roll ..	..... Stearns-Knight, Four
Gray & Davis	Disk....	Sel ...	Unit M..	4	Bevel...	Springs....	Float ...	3.40–1	134-40	37x5	37x5	Wood ..	½ Ell..	Left	Cent..	Plain, 7 .	Ball ..	Roll ..	Roll ..	..... Stearns-Knight, Six
Westing'se ..	Disk....	Prog..	Unit M .	3	Bevel ..	S & T T .	Float ...	3.70–1	131-38	37x4½	37x4½	Wood ..	½ Ell..	Right...	Right.	Plain, 4 .	Ball ..	Ball ..	Ball ..	..... Stevens-Duryea, C6
Stud-Wagner	Cone ...	Sel ...	Unit X..	3	Bevel...	Rad Rd...	Float ...	4.00–1	108	32x3½	32x3½	Wood ..	Ell ...	Left	Cent..	Plain, 3 .	Roll ..	Roll ..	Roll ..	..... Studebaker, Four
Stud-Wagner	Cone ...	Sel ...	Unit X..	3	Bevel...	Rad Rd...	Float ...	3.70–1	121	34x4	34x4	Wood ..	½ Ell..	Left	Cent..	Plain, 4 .	Roll ..	Roll ..	Roll ..	..... Studebaker, Six
Stutz-Remy .	Cone ...	Sel ...	Unit X..	3	Bevel...	Tor T	¾ Float .	.....	130	34x4½	34x4½	Wood ..	½ Ell..	Right...	Right.	Plain, 3 .	Ball ..	B&R..	Roll ..	..... Stutz, 4-E
Stutz-Remy .	Cone ...	Sel ...	Unit X..	3	Bevel...	Tor T.....	¾ Float .	.....	120	34x4½	34x4½	Wood ..	½ Ell..	Right...	Right.	Plain, 3 .	Ball ..	B&R..	Roll ..	..... Stutz, 4-E
Stutz-Remy .	Cone ...	Sel ...	Unit X..	3	Bevel...	Tor T.....	¾ Float .	.....	130	34x4½	34x4½	Wood ..	½ Ell..	Right...	Right.	Plain, 3 .	Ball .	B&R..	Roll ..	..... Stutz, 6-E
Stutz-Remy.	Cone ...	Sel ...	Unit X..	3	Bevel...	Tor T.....	¾ Float .	.....	120	34x4½	34x4½	Wood ..	½ Ell..	Right...	Right.	Plain, 3 .	Ball ..	B&R..	Roll ..	..... Stutz, 6-E
Gray & Davis	Disk....	Sel ...	Unit M..	4	Bevel...	Tor T.....	Float ...	3.50–1	134-24	34x4½	34x4½	Wood ..	½ Ell..	Left	Cent..	Plain, 3 .	Roll ..	Ball ..	Roll ..	..... Touraine, 12
Undecided ..	Disk....	Sel ...	Unit M..	3	Bevel...	Tor T.....	Float ...	3.75–1	118	34x4	34x4	Wood ..	½ Ell..	Left	Cent..	Plain, 3 .	Ball ..	Roll ..	Roll ..	..... Tribune, A
Bijur	Disk....	Sel ...	Amid ...	4	Bevel...	Tor T.....	Float ...	3.04–1	138	35x4½	35x4½	Wood ..	Cant .	Left	Cent..	Plain ,4 .	Ball ..	Ball ..	Ball ..	..... Vaughan, Six
Gray & Davis	Disk....	Sel ...	Unit X..	3	Bevel...	Springs....	¾ Float .	4.00–1	113	34x4	34x4	Wood ..	½ Ell..	Left	Cent..	Plain, 3 .	Ball ..	B&R..	B&R..	..... Velie, 5
Gray & Davis	Disk....	Sel ...	Amid ...	4	Bevel...	Springs....	Float ...	4.00–1	121	36x4	36x4	Wood ..	½ Ell..	Left	Cent..	Plain, 3 .	Ball ..	Roll ..	Roll ..	..... Velie, 9
Gray & Davis	Disk....	Sel ...	Amid ...	4	Bevel...	Springs....	Float ...	4.00–1	126	7x4½	37x4½	Wood ..	½ Ell..	Left	Cent..	Plain, 3 .	Ball ..	Roll ..	Roll ..	..... Velie, 10
Gray & Davis Ex	Cone ...	Sel ...	Unit M..	3	Bevel...	Tor T.....	Semi F .	4.00–1	105–15	32x3½	32x3½	Wood ..	½ Ell..	Left	Cent..	Plain, 2 .	Plain .	Ball ..	Ball ..	..... Vulcan, 27
White-Entz .	Cone ...	Sel ...	Amid ...	4	Bevel...	Rad Rd...	.....	.....	110	34x4	34x4	Wood ..	½ Ell..	Left	Cent..	Ball, 2 ..	Ball ..	Ball ..	Ball ..	..... White, GAF
White-Entz .	Cone ...	Sel ...	Amid ...	4	Bevel...	Rad Rd...	.....	.....	120	36x4½	36x4½	Wood ..	½ Ell..	Left	Cent..	Ball, 2 ..	Ball ..	Ball ..	Ball ..	..... White, GEB
White-Entz..	Cone ...	Sel ...	Amid ...	4	Bevel...	Rad Rd...	.....	.....	132	37x5	37x5	Wood ..	½ Ell..	Left	Cent..	B&P, 3..	Ball ..	Ball ..	Ball ..	..... White, GF
U. S. L.....	Cone ...	Sel...	Amid...	4	Worm ..	Rad Rd .	Float...	4.80–1	120	36x4½	36x4½	Wire....	Cant..	Left ...	Cen ..	Plain, 5.	Roll..	Roll..	Roll..	.....Willys-Knight, K-17
Gray & Davis	Disk....	Sel ...	Amid ...	4	Bevel...	Springs ...	Float ...	3.43–1	130	36x4½	36x4½	Wood ..	½ Ell..	Left	Cent..	Plain, 4 .	Ball ..	Roll ..	Roll ..	..... Winton, 20
.....	.....	Plan..	Amid ...	2	Chain...	Rad Rd...	Dead ...	4.50–1	80	30x3	30x3	Wood ..	Ell ...	Right...	Pedal..	Plain, 2 .	Plain .	B&R..	B&R..	..... Zimmerman, D&E
Remy	Disk....	Sel ...	Unit M..	3	Bevel...	Tor T.....	Float ...	3.50–1	132	36x4	36x4	Wood ..	½ Ell..	Opt.....	Cent..	Plain, 4 .	Ball ..	Ball ..	Ball ..	..... Zimmerman, B-6

ABBREVIATIONS:—Clutch Type: Exp. Bd., expanding band; Con. Bd., contracting band. **Gearset:** Sel., selective; Prog., progressive; Plan., planetary; Fric., friction; Unit M, unit with the motor; Unit X, unit with the rear axle; Amid., amidships. **Drive:** Bevel, shaft with bevel gears in rear axle; Worm, shaft with worm gears in rear axle; Worm B, shaft with worm bevel gears in rear axle. **Car Drives Through:** Tor. T., torsion tube; Tor. R., torsion rod; Rad. Rd., radius rods; TTRR, torsion tube and radius rods. **Rear Axle:** Float, floating; Semi F., semi-floating; ¾ Float., three-quarter floating. **Gear Ratio:*** two speed rear axle. **Wheels:** Opt., optional. **Springs:** Ell., elliptic; ½ Ell., semi-elliptic; ¾ Ell, three-quarter elliptic; Plat., platform. **Gearshift:** Elec., electrically operated; **Bearings:** Roll., roller; B. & R., ball and roller; B. & P., ball and plain; B. R. & P., ball, roller and plain.

Directory of American Motor Car Manufacturers of 1914

Growth of the Industry as Evidenced by New Vehicles

UNCLE SAM'S most precocious industrial child, the motor car industry, is a wonderfully developed youngster and starts the new year with confidence, optimism and determination. Once —and that was not long ago—ranked as a Gulliver among the Brobdingnagians of manufacture and trade, the motor car industry has grown so fast and so healthy that recently the national nurses at Washington knocked down the tariff wall and sent the gasoline-dieted infant to meet foreign competition on the highways of commerce. Statistics for 1913 are an indication of the marvelous growth of this industry which was undreamed of less than a score of years ago. It is estimated that the number of cars and trucks produced during the past year attained the surprising total of 450,000. The bulk of this output was gasoline pleasure cars, the number of which is roughly computed at 410,000. The production for the entire year of 1912 was 378,261 motor vehicles, comprising 340,746 gasoline pleasure cars, 27,909 gasoline commercial vehicles, 8,813 passenger electrics, 743 electric trucks and 850 steam-propelled conveyances.

Car Name	Name of Maker	Address	No. Chassis Models	Six-Cylinder	Four-Cylinder	Right Drive	Left Drive	Worm Drive	Wire Wheels	Electric Crankers	Air Crankers	Body Types and Seating Capacity: Roadsters, 2 & 3	Touring: 4	Touring: 5	Touring: 6	Touring: 7	Coupes	Large Inclosed Cars
Abbott:Detroit	Abbott Motor Co	Detroit, Mich	3	1	2	2	1	....	....	3	....	3	1	1	....	2	1	2
Allen	Allen Motor Car Co	Fostoria, Ohio	1	....	1	....	1	....	....	1	....	1	....	1	....	....	....	....
American	American Motors Co	Indianapolis, Ind	2	2	....	2	....	....	....	2	....	4	....	3	1	....	2	....
Ames	Ames Motor Car Co	Owensboro, Ky	1	....	1	....	1	....	....	1	....	1	....	1	....	....	....	....
Apperson	Apperson Bros. Automobile Co	Kokomo, Ind	6	4	2	....	6	....	....	6	....	3	....	4	....	....	1	1
Arbenz	Arbenz Car Co	Chillicothe, Ohio	1	....	1	....	1	....	....	....	....	1	1	1	....	....	....	....
Auburn	Auburn Automobile Co	Auburn, Ind	4	2	2	1	3	....	....	4	....	2	....	2	2	....	2	....
Austin	Austin Automobile Co	Grand Rapids, Mich	2	1	1	....	2	....	....	1	1	2	....	2	....	2	....	2
Buick	Buick Motor Co	Flint, Mich	3	1	2	....	3	....	....	3	....	3	....	2	....	1	1	....
Cadillac	Cadillac Motor Car Co	Detroit, Mich	1	....	1	1	....	....	....	1	....	1	1	1	1	1	1	2
Cameron	Cameron Car Co	West Haven, Mass	1	....	1	....	1	....	....	1	....	1	....	1	....	....	....	....
Cartercar	Cartercar Co	Pontiac, Mich	2	....	2	2	....	....	....	2	....	2	....	2	....	....	1	1
Case	J. I. Case T. M. Co	Racine, Wis	3	....	3	1	2	....	....	3	....	....	....	3	....	1	....	....
Chadwick	Chadwick Engineering Works	Pottstown, Pa	2	2	....	2	....	....	....	1	....	1	....	1	....	1	....	1
Chalmers	Chalmers Motor Co	Detroit, Mich	1	1	....	....	1	....	....	1	....	1	1	1	1	....	1	1
Chandler	Chandler Motor Co	Cleveland, Ohio	1	1	....	....	1	....	....	1	....	....	....	1	....	....	....	....
Chevrolet	Chevrolet Motor Co	Flint, Mich	2	....	2	....	2	....	....	....	....	1	....	1	....	....	....	....
Church	Church Motor Car Co	Detroit, Mich	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Coey	Coey-Mitchell Auto. Co	Chicago, Ill	1	....	1	1	....	....	....	....	....	....	....	1	....	....	....	....
Colby	Colby Motor Co	Mason City, Ia	1	1	....	1	....	....	....	1	....	1	....	....	....	1	....	....
Cole	Cole Motor Car Co	Indianapolis, Ind	2	1	1	....	2	....	....	2	....	2	1	1	1	1	2	1
Continental	Martindale & Millikan	Franklin, Ind	2	....	2	1	1	....	....	1	....	1	....	2	....	....	....	....
Corbitt	Corbitt Automobile Co	Henderson, N. C	1	....	1	1	....	....	....	1	....	1	1	1	....	....	....	....
Correja	Van Dewater & Co	Elizabeth, N. J	1	1	....	....	1	....	....	1	....	1	....	1	1	....	....	....
Crane	Crane Motor Car Co	Bayonne, N. J	1	1	....	....	1	....	....	1	....	....	....	....	....	....	....	....
Crow-Elkhart	Crow Motor Co	Elkhart, Ind	3	1	2	3	....	....	....	2	....	3	2	3	2	....	....	....
Crown	Crown Motor Car Co	Louisville, Ky	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Croxton	Croxton Motor Car Co	Washington, Pa	1	....	1	....	1	....	....	....	....	....	1	....	....	....	....	....
Cunningham	James Cunningham, Son & Co	Rochester, N. Y	1	....	1	....	1	....	....	1	....	1	1	1	....	1	....	3
Davis	George W. Davis Carriage Co	Richmond, Ind	3	2	1	1	2	....	....	3	....	1	....	3	1	....	....	....
Day	Day Automobile Co	Detroit, Mich	1	....	1	1	....	....	....	....	....	....	....	1	....	....	....	....
DeSoto	DeSoto Motor Car Co	Auburn, Ind	1	1	....	1	1	....	....	....	1	....	....	1	....	....	....	....
Detroiter	Briggs-Detroiter Co	Detroit, Mich	1	....	1	....	1	....	....	....	....	3	....	2	....	....	....	....
Dispatch	Dispatch Motor Car Co	Minneapolis, Minn	1	....	1	1	....	....	....	....	....	1	....	1	....	....	1	....
Dorris	Dorris Motor Car Co	St. Louis, Mo	1	....	1	....	1	....	....	1	....	....	1	1	1	1	....	1
Duryea	Duryea Motor Co	Saginaw, Mich	1	....	1*	....	....	....	....	....	....	1	1	....	....	....	....	....
Empire	Empire Automobile Co	Indianapolis, Ind	1	....	1	1	....	....	....	....	....	....	....	1	....	....	....	....
Enger	Enger Motor Car Co	Cincinnati, Ohio	1	....	1	1	....	....	....	1	....	1	....	1	....	....	....	....
Fal	F. A. L. Motor Co	Chicago, Ill	2	....	2	2	....	....	....	....	1	2	1	1	....	....	....	....
Fiat	Fiat Co	Poughkeepsie, N. Y	3	1	2	3	1	....	....	....	....	5	....	3	....	3	....	9
Firestone-Columbus	Columbus Buggy Co	Columbus, Ohio	4	1	3	....	4	....	....	4	....	2	....	3	....	2	1	1
Flyer	Flyer Motor Car Co	Detroit, Mich	1	....	1	....	1	....	1	1	....	1	....	....	....	....	....	....
Ford	Ford Motor Co	Detroit, Mich	1	....	1	....	1	....	....	....	....	1	....	1	....	....	....	1
Franklin	H. H. Franklin Mfg. Co	Syracuse, N. Y	1	1	....	....	1	....	....	1	....	1	....	1	....	....	1	3
Gleason	Bauer Machine Works Co	Kansas City, Mo	1	....	....	1	....	....	....	....	....	2	....	1	....	....	....	....
Glide	Bartholomew Co	Peoria, Ill	1	....	1	....	1	....	....	1	....	1	....	1	....	....	....	....
Grant	Grant Motor Car Co	Detroit, Mich	1	....	1	....	1	....	....	....	....	1	....	....	....	....	....	....
Great Eagle	United States Carriage Co	Columbus, Ohio	1	....	1	....	1	....	....	1	....	....	....	....	....	1	....	2
Great Southern	Great Southern Automobile Co	Birmingham, Ala	1	....	1	1	....	....	....	....	....	....	....	....	....	1	....	....
Great Western	Great Western Auto Co	Peru, Ind	1	....	1	1	....	....	....	1	....	1	1	1	....	....	....	....
Havers	Havers Motor Car Co	Port Huron, Mich	2	2	....	2	....	....	....	2	....	4	....	1	....	....	....	....
Haynes	Haynes Automobile Co	Kokomo, Ind	3	2	1	....	3	....	....	3	....	2	2	2	1	1	2	1
Henderson	Henderson Motor Car Co	Indianapolis, Ind	2	1	1	....	2	....	....	2	....	2	....	3	....	....	2	....
Herreshoff	Herreshoff Motor Co	Detroit, Mich	2	1	1	....	2	....	....	2	....	3	1	2	1	1	1	....
Holly	Holly Motor Co	Mt. Holly, N. J	1	1	....	....	1	....	....	....	....	1	....	1	1	1	....	....
Howard	Central Car Co	Connersville, Ind	1	1	....	....	1	....	....	1	....	....	....	1	....	....	....	....
Hudson	Hudson Motor Car Co	Detroit, Mich	2	2	....	....	2	....	....	2	....	1	....	1	1	1	1	1
Hupmobile	Hupp Motor Car Co	Detroit, Mich	2	....	2	2	....	....	....	....	....	1	....	1	1	....	1	....
Illinois	Overholt Co	Galesburg, Ill	1	....	1	1	....	....	....	....	1	....	....	....	1	....	....	....
Imperial	Imperial Automobile Co	Jackson, Mich	4	2	2	3	1	....	....	4	....	2	2	....	3	....	....	....
Inter-State	Inter-State Automobile Co	Muncie, Ind	1	1	....	....	1	....	....	1	....	....	....	1	....	....	....	....
Jackson	Jackson Automobile Co	Jackson, Mich	3	1	2	3	....	....	....	3	....	1	....	3	....	....	....	....
Jeffery	Thos. B. Jeffery Co	Kenosha, Wis	2	1	1	....	2	....	....	2	....	2	....	2	1	....	1	4
Keeton	Keeton Motor Car Co	Detroit, Mich	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....
King	King Motor Car Co	Detroit, Mich	1	....	1	1	1	....	....	1	....	1	....	1	....	....	....	....
Kissel	Kissel Motor Car Co	Hartford, Wis	3	2	1	....	3	....	....	3	....	3	....	2	....	1	1	2
Klinekar	Kline Motor Car Corp	Richmond, Va	4	2	2	1	3	....	....	4	....	2	3	2	1	1	3	....
Knox	Knox Automobile Co	Springfield, Mass	4	2	2	3	2	....	....	4	....	4	3	2	3	4	....	6
Krit	Krit Motor Car Co	Detroit, Mich	1	....	1	....	1	....	....	....	....	1	....	1	....	....	....	....
Lambert	Buckeye Manufacturing Co	Anderson, Ind	2	....	2	1	1	....	....	2	....	....	1	1	....	....	....	....
Lenox	Lenox Motor Car Co	Boston, Mass	2	1	1	....	2	....	....	2	....	2	2	1	1	....	....	....

*2 Cylinder

Scope of the Products of Each Maker with Body Models

Comparison of Field With That of Previous Years

Comparisons, though odious, often are encouraging. The gain of 1913 over 1912 was 109,254 vehicles, or 31.6 per cent. Compare 1913 with 1911 and the results are even more startling. The total production of 2 years ago was 209,957, crediting late-lamented 1913 with an increase of better than 50 per cent over 1911. According to the statisticians, there are 553 companies manufacturing motor vehicles in the United States at the present time, 235 building pleasure cars and 318 turning out commercial vehicles. In addition, there are seventy-five manufacturers of motors. The following thirty of the forty five states can boast of one or more such companies: Alabama, California, Colorado, Connecticut, Georgia, Illinois, Indiana, Iowa, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Nebraska, New Jersey, New York, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Dakota, Tennessee, Texas, Virginia, West Virginia and Wisconsin. Breaking the production record of the year previous has become a fixed habit and outputs for 1914 will eclipse that of 1913.

Car Name	Name of Maker	Address	No. Chassis Models	Six-Cylinder	Four-Cylinder	Right Drive	Left Drive	Worm Drive	Wire Wheels	Electric Crankers	Air Cranker	Body Types and Seating Capacity: Roadsters, 2 & 3	Touring: 4	Touring: 5	Touring: 6	Touring: 7	Coupes	Large Inclosed Cars
Lewis	L. P. C. Motor Co	Racine, Wis	1	1			1			1					1			
Locomobile	Locomobile Co. of America	Bridgeport, Conn.	3	3		2	2			3		2	3	3	1	2	1	7
Lozier	Lozier Motor Co	Detroit, Mich	2	1	1		2			2		2		2	1	1	2	3
Luverne	Luverne Automobile Co.	Luverne, Minn.	1	1			1				1					1		
Lyons-Knight	Lyons-Atlas Co.	Indianapolis, Ind	2	1	1		2		2	2				2		2		4
Marathon	Marathon Motor Works	Nashville, Tenn	3		3	3				2		3	2	3				
Marion	Marion Motor Car Co	Indianapolis, Ind	2	1	1		2			2		3		2			2	1
Marmon	Nordyke & Marmon Co.	Indianapolis, Ind	3	2	1		3			3		4	3	3		2		6
Mason	Mason Motor Co	Waterloo, Ia																
Maxwell	Maxwell Motor Co	Detroit, Mich.	3	1	2	1	3			3				2		1		
McFarlan	McFarlan Motor Car Co	Connersville, Ind.	1	1			1				1	1	1	1	1	1	1	1
McIntyre	W. W. McIntyre Co	Auburn, Ind.																
Mercer	Mercer Automobile Co	Trenton, N. J	3		3	3				2		2		2				
Metropol	Metropol Motor Corp.	New York	1		1	1						1	1					
Meteor	Meteor Motor Car Co.	Shelbyville, Ind.	3	1	2	3				3				3				
Metz	Metz Co	Waltham, Mass.	1		1		1					1						
Mitchell-Lewis	Mitchell-Lewis Motor Co.	Racine, Wis	3	2	1		3			3		2	2	2		1		
Moline-Knight	Moline Automobile Co.	E. Moline, Ill	1		1		1			1				1		1		
Monarch	Monarch Motor Car Co.	Detroit, Mich	1		1	1				1				1				
Mondex-Magic	Aristos Co.	New York	2	2			2		2	2			1		2			2
Moon	Moon Motor Car Co	St. Louis, Mo	2	1	1		2			2		2	2	2	1		2	
Morse	Easton Machine Co.	S. Easton, Mass.	1		1	1				1		1	1	1		1		
Moyer	H. A. Moyer	Syracuse, N. Y	2	1	1	2				2		1		1		1		
Multiplex	Multiplex Mfg. Co	Berwick, Pa.																
National	National Motor Vehicle Co	Indianapolis, Ind	2	1	1		2			2		2	2	2		1	1	1
Norwalk	Norwalk Motor Car Co.	Martinsburg, W. Va	2	2			2			2		2	2		2			2
Oakland	Oakland Motor Car Co	Pontiac, Mich	2	1	1		2			2		1		1			1	
Ohio	Crescent Motor Co	Cincinnati, Ohio	2	1	1	1	1			2		2		2				
Oldsmobile	Olds Motor Works	Lansing, Mich	1	1		1				1				1		1		1
Overland	Willys-Overland Co	Toledo, Ohio	1		1	1				1		1		1			1	
Packard	Packard Motor Car Co	Detroit, Mich	2	2			2			2		4	3	3	3	4	4	37
Paige-Detroit	Paige-Detroit Motor Car Co	Detroit, Mich.	2		2	1	1			1		1		2			1	1
Palmer-Singer	Palmer & Singer Mfg. Co	New York	2	2		1	1			2		2		2				
Partin-Palmer	Partin Manufacturing Co.	Chicago	1		1		1								1			
Paterson	W. A. Paterson Co	Flint, Mich.	1		1		1			1		1		1				
Pathfinder	Motor Car Mfg Co	Indianapolis, Ind	2	1	1	1	1			2		2		1	1	1	1	
Peerless	Peerless Motor Car Co	Cleveland, Ohio.	3	3		3	3			3		1	1	1	2	2	1	9
Pierce-Arrow	Pierce Arrow Motor Car Co.	Buffalo, N. Y.	3	3		3				3		3	3	3		6		16
Pilot	Pilot Motor Car Co	Richmond, Ind	2	1	1	2	2			2		2	2	2	2	2		
Pope-Hartford	Pope Mfg. Co.	Hartford, Conn																
Pratt	Elkhart Car & Harness Mfg. Co	Elkhart, Ind	1		1	1				1		1	1	1		1		
Premier	Premier Motor Mfg. Co.	Indianapolis, Ind	2	2			2			2		2		2		1		
Pullman	Pullman Motor Car Co	York, Pa.	4	2	2	1	4		1	4			1	1		2		
Rayfield	Rayfield Motor Car Co	Chrisman, Ill.	1	1		1				1		1	1	1	1		1	
Read	Read Motor Car Co.	Detroit, Mich	1		1		1							1				
Regal	Regal Motor Car Co.	Detroit, Mich.	2		2		2			2		1		2			1	
Reo	Reo Motor Car Co.	Lansing, Mich	1		1		1			1		1		1				
Republic	Republic Motor Car Co	Hamilton, Ohio	1	1			1			1				1		1		
Richmond	Wayne Works.	Richmond, Ind	3	1	2	3				3				3				
Saxon	Saxon Motor Co	Detroit, Mich	1		1		1		1			1						
Selden	Selden Motor Vehicle Co.	Rochester, N. Y	1		1	1				1		1		1				
S. G. V.	S. G. V. Co.	Reading, Pa	1		1		1			1		1	1	1				3
S. & M	S. & M. Motor Co.	Detroit, Mich	1	1			1		1	1		1		1		2		
Simplex	Simplex Automobile Co	New Brunswick, N. J	3		3	3				3				2		2		4
Spoerer	Carl Spoerer's Co.	Baltimore, Md	1		1	1				1		1		1		1		
Spaulding	Spaulding Mfg. Co	Grinnell, Iowa	1		1		1			1				1				
Speedwell	Speedwell Motor Car Co	Dayton, Ohio.	1	1			1			1			1	1		1		
Staver	Staver Carriage Co.	Chicago	2	1	1		2			2				1		1		
Stearns	F. B. Stearns Co	Cleveland, Ohio	2	1	1		2			2		2	2	2	2	2	2	6
Stevens-Duryea	Stevens-Duryea Co.	Chicopee Falls, Mass.																
Studebaker	Studebaker Corp.	Detroit, Mich.	2	1	1		2			2				1		1	2	1
Stutz	Stutz Motor Car Co	Indianapolis, Ind	4	2	2	4				4		4			2		2	
Touraine	Touraine, Co	Philadelphia, Pa.	1	1			1			1		1		1		1		
Traveler	Traveler Motor Car Co.	Detroit, Mich																
Tribune	Tribune Motor Co	Detroit, Mich	1		1		1							1				
Vaughan	Vaughan Car Co	Kington, N. J	1	1			1					1	2		2			
Velie	Velie Motor Vehicle Co	Moline, Ill.	3	1	2		3			3		2	2	3				
Vulcan	Vulcan Mfg. Co.	Painsville, Ohio	1		1		1					1		1				
Wescott	Wescott Motor Car Co.	Richmond, Ind.																
White	White Co	Cleveland, Ohio	3	1	2		3			3		3		3		2	3	2
Willys-Knight	Willys-Overland Co	Toledo, Ohio	1		1		1	1	1	1		1		1				
Winton	Winton Motor Car Co	Cleveland, Ohio	1	1			1				1	2	2	1	1	1	3	3
Zimmerman	Zimmerman Mfg Co.	Auburn, Ind.	2		1*		1					1		1				

*2 Cylinder

The Buyers'

AMERICAN motor cars as produced for the 1914 season offer a wide range in choice of models in nearly every respect which appeal to the prospective purchaser. There are no less than 135 different factories producing motor cars in the United States, and their offerings include 250 different designs of chassis; that is, there are this number of cars having different mechanical features. On many of these chassis a wide range of body styles is offered giving the purchaser a choice from at least 550 complete cars.

In the matter of price, the buyer may choose anything from the little $395 Saxon roadster, rated at only 11 horsepower, to the luxurious limousines listed at between $7,000 and $8,000 with standard body, while special bodies and fittings may increase the price to the dictates of the most plethoric purse.

Of these 250 chassis between ninety and 100 are six-cylinder cars, while the rest are four-cylinder creations with the exception of two two-cylinder cars.

ON this and the succeeding pages are given brief specifications of each of the different complete cars manufactured by American makers for the 1914 season. To make their study easy, they are arranged in four classes according to price; the $1,000 class embracing all cars sold at a price less than $1,250, the $1,500 class including those selling from $1,250 to

Products of these 135 makers include 172 of the two or three-passenger open cars variously known as runabouts, roadsters and speedsters; open touring cars, sixty-eight of which are of four-passenger capacity, 175 seating five people, forty-six seating six and seventy-six seating seven. Also there are fifty-eight small inclosed cars of two or three-passenger capacity, generally called coupes. Also there are 145 different styles of the inclosed cars with a greater seating capacity, which include the styles known as limousines, landaulets, broughams, berlines and sedans. In addition to these, there have appeared three combination or convertible bodies of the two-passenger type which may be transformed from open roadsters into coupes. These are known as cabriolets, landau-roadsters and convertible coupe roadsters.

Cars Costing Under $1,250

Probably the greatest number of motor car buyers are interested in those motor vehicles which can be bought at a rather low figure. Of the class of cars which has come to be known as the cheap

Motor Cars for 1914 Season Costing Less than $1,250

NAME AND MODEL	Body Style and Seating Capacity	Price	No. of Cylinders	S. A. E. H. P.	Wheelbase Inches	Tire Size Inches	Location of Steering
Buick, B-24	Roadster, 2	$950	4	22.50	105	32x3½	Left
Buick, B-25	Touring, 5	1,050	4	22.50	105	32x3½	Left
Buick, B-36	Roadster, 2	1,235	4	22.50	112	34x4	Left
Cameron	Runabout, 2	1,200	4	20.25	115	32x3½	Left
Cameron	Touring, 5	1,200	4	20.25	115	32x3½	Left
Chevrolet, H-2	Roadster, 2	750	4	21.38	104	30x3½	Left
Chevrolet, H-4	Touring, 5	875	4	21.38	104	32x3½	Left
Coey, A	Touring, 5	995	4	48.40	128	34x4	Right
Continental, 30	Roadster, 2	1,000	4	19.60	110	32x3½	Left
Continental, 30	Torpedo, 5	1,000	4	19.60	110	32x3½	Left
Crow Elkhart, D-42	Roadster, 2	1,150	4	25.60	114	33x4	Right
Crow Elkhart, D-45	Touring, 5	1,185	4	25.60	114	33x4	Right
Detroiter, A-3 and A-4	Roadster, 2	900	4	19.60	104	32x3½	Left
Detroiter, A-1 and A-2	Touring, 5	900	4	19.60	104	32x3½	Left
Detroiter, A-5	Roadster, 2	1,025	4	19.60	104	32x3½	Left
Detroiter, A-6	Touring, 5	1,025	4	19.60	104	32x3½	Left
Dispatch, 1914	Roadster, 2	850	4	22.50	120	36x3½	Right
Dispatch, 1914	Touring, 5	900	4	22.50	120	36x3½	Right
Dispatch, 1914	Coupe, 2	1,000	4	22.50	120	36x3½	Right
Duryea	Buggy, 2	450	2	.....	86	44x1½*	Center
Duryea	Surrey, 4	500	2	.....	96	44x1½*	Center
Empire, 31	Touring, 5	900	4	22.50	109	32x3½	Right
Flyer, A	Roadster, 2	495	4	12.10	100	28x3	Left
Ford, T	Roadster, 2	500	4	22.50	100	30x3½*	Left
Ford, T	Touring, 5	550	4	22.50	100	30x3½*	Left
Ford, T	Town car, 6	750	4	22.50	100	30x3½*	Left
Gleason, R	Roadster, 2	850	2	18.00	96	36x2	Right
Gleason, R	Roadster, 3	875	2	18.00	96	36x2	Right
Gleason, R	Touring, 5	1,000	2	18.00	96	36x2	Right
Grant	Roadster, 2	495	4	12.10	90	28x3	Left
Hupmobile, HR	Roadster, 2	1,050	4	16.90	106	33x4	Right
Hupmobile, H	Touring, 5	1,050	4	16.90	106	33x4	Right
Hupmobile, HM	Touring, 6	1,200	4	16.90	106	33x4	Right
King, B	Roadster, 2	1,095	4	24.00	112	33x4	Left
King, B	Touring, 5	1,095	4	24.00	112	33x4	Left
Krit, L	Roadster, 2	$950	4	22.50	108	32x3½	Left
Krit, L	Touring, 5	950	4	22.50	108	32x3½	Left
Lambert, 46	Touring, 4	1,200	4	22.50	112	32x3½	Left
Marathon, Runner	Roadster, 2	925	4	19.60	104	32x3½	Right
Marathon, Runner	Touring, 5	975	4	19.60	104	32x3½	Right
Maxwell, 25-4	Touring, 5	750	4	20.25	103	30x3½	Left
Maxwell, 35-4	Touring, 5	1,225	4	25.60	110	33x4	Left
Meteor, M-36	Touring, 5	950	4	25.60	116	34x3½	Right
Metz	Roadster, 2	475	4	22.50	90	30x3	Left
Monarch	Touring, 5	925	4	16.27	110	32x3½	Left
Oakland, 36	Touring, 5	1,200	4	19.60	112	33x4	Left
Overland, 79	Roadster, 2	950	4	27.25	114	33x4	Right
Overland, 79	Touring, 5	950	4	27.25	114	33x4	Right
Paige, 25	Touring, 5	975	4	22.50	110	32x3½	Right
Partin-Palmer, 38	Touring, 6	975	4	.....	115	32x3½	Left
Paterson, 33	Roadster, 2	1,200	4	19.60	112	32x3½	Left
Paterson, 35	Touring, 5	1,235	4	19.60	112	32x3½	Left
Read, 30	Touring, 5	850	4	19.60	115	32x3½	Left
Regal, T	Touring, 5	1,125	4	22.50	108	32x3½	Left
Regal, N	Roadster, 2	1,125	4	22.50	108	32x3½	Left
Reo, Fifth	Roadster, 2	1,175	4	25.60	112	34x4	Left
Reo, Fifth	Touring, 5	1,175	4	25.60	112	34x4	Left
Richmond, R	Roadster, 2	1,150	4	27.25	114	34x4	Right
Saxon	Roadster, 2	395	4	11.00	96	28x3	Left
Studebaker, Four	Roadster 2	1,200	4	19.60	108	32x3½	Left
Studebaker, Four	Touring, 5	1,050	4	19.60	108	32x3½	Left
Vulcan, 27	Speedster	750	4	18.25	105	32x3½	Left
Vulcan, 27	Touring, 5	850	4	18.25	105	32x3½	Left
Zimmerman	Roadster, 2	450	2	16.20	80	30x3	Right

*Rear tires only; front tires are a size smaller

Motor Guid

$1,999 inclusive, the $2,500 class embracing those costing from $2,000 to $2,999 inclusive and the $4,000 class containing all cars which cost $3,000 or over. In each case the price includes the stock equipment. Detailed specifications of the mechanical part of each of these will be found in the chassis specification tables, pages 34 to 41.

cars and often referred to as the $1,000 class of cars and listed at anything under $1,250, there are at least thirty-five different makes, offering a choice of sixty-five different cars. All of these are of the four-cylinder type, except two, which have two-cylinder engines. Most of them are fitted with electric cranking and lighting system, although for this feature an additional charge of about $150 generally is made.

There are six different makers who produce cars listing at $500 or less. In this class there are twenty-eight runabouts and roadsters, thirty-three four or five-passenger touring cars, one coupe and one town car. The average car of this price is listed at $950, has a four-cylinder motor of 3.9 bore and 4.4 inches stroke, rating at 21.4 horsepower S. A. E.; its wheelbase is 107 inches and its tires are 33 by 3½ inches.

Cars listed at from $1,250 to $1,999

Among the cars whose prices center about $1,500, and embracing the field selling at from $1,250 to $1,999, there are fifty-four different makers who offer 130 different types. Among these there is a very respectable showing of six-cylinder cars, although the fours, of course, are much in the majority.

In this $1,500 class are included forty-two roadsters, seventy-five touring cars, eleven closed cars and three of the convertible coupe roadsters.

The average car of this class has a 20.6-horsepower motor, a wheelbase of 188.5 inches, 34 by 4-inch tires and almost invariably is fitted with an electric cranking and lighting outfit at the list price.

There are in this class thirteen makes of six-cylinder cars offered this year. This means that a little more than one-fourth of the fifty-four makers list sixes which may be had at less than $2,000. The Richmond is the lowest-priced six on the market, listing at $1,500 with stock equipment.

Motor Cars for 1914 Season Costing $1,250 to $1,999

NAME AND MODEL	Body Style and Seating Capacity	Price	No. of Cylinders	S. A. E. H. P.	Wheelbase Inches	Tire Size Inches	Location of Steering
Abbott-Detroit, 34-40K	Roadster, 3	$1,785	4	27.25	116	34x4	Right
Abbott-Detroit, 34-40K	Touring, 5	1,785	4	27.25	116	34x4	Right
Allen, 40	Roadster, 2	1,395	4	27.25	118	34x4	Left
Allen, 40	Touring, 5	1,395	4	27.25	118	34x4	Left
Ames, 45	Roadster, 2	1,745	4	27.25	118	36x4	Left
Ames, 45	Touring, 5	1,785	4	27.25	118	36x4	Left
Apperson, 4-45	Roadster, 2	1,600	4	32.40	116	34x4	Left
Apperson, 4-45	Touring, 5	1,600	4	32.40	116	34x4	Left
Apperson, 4-45	Touring, 5	1,785	4	32.40	120	36x4	Left
Arbens	Roadster, 2	1,825	4	27.25	120	36x4	Left
Arbens	Touring, 4 and 5	1,885	4	27.25	120	36x4	Left
Auburn, 4-40	Roadster, 2	1,490	4	32.40	120	36x4	Left
Auburn, 4-40	Touring, 5	1,490	4	32.40	120	36x4	Left
Auburn, 4-40	Coupe, 3 and 4		4	32.40	120	36x4	Left
Auburn, 4-41	Touring, 6	1,590	4	32.40	120	36x4	Left
Buick, B-37	Touring, 5	1,335	4	22.50	112	34x4	Left
Buick, B-38	Coupe, 3	1,800	4	22.50	112	34x4	Left
Buick, B-55	Touring, 7	1,985	6	33.75	130	36x4½	Left
Cadillac, 1914	Touring, 5	1,975	4	32.60	120	36x4½	Right
Cadillac, 1914	Phaeton, 4	1,975	4	32.60	120	36x4½	Right
Cadillac, 1914	Roadster, 2	1,975	4	32.60	120	36x4½	Right
Cartercar, 5	Roadster, 2	1,600	4	27.25	116	36x4	Right
Cartercar, 5	Touring, 5	1,700	4	27.25	116	36x4	Right
Cartercar, 5	Coupe, 3	1,900	4	27.25	116	36x4	Right
Cartercar, 7	Roadster, 2	1,250	4	19.60	106	32x3½	Right
Cartercar, 7	Touring, 5	1,250	4	19.60	106	32x3½	Right
Case, 25	Touring, 5	1,250	4	22.50	110	32x4	Left
Case, 35	Touring, 5	1,850	4	28.90	120	35x4½	Left
Chandler, 14	Touring, 5	1,785	4	27.40	120	34x4	Left
Cole, Four	Roadster, 2	1,925	4	28.90	120	34x4½	Left
Cole, Four	Touring, 5	1,925	4	28.90	120	34x4½	Left
Cole, Four	Touring, 4	1,925	4	28.90	120	34x4½	Left
Continental, 27	Torpedo, 5	1,800	4	32.40	118	34x4	Right
Corbitt, D	Roadster, 2	1,400	4	25.60	120	34x4	Right
Corbitt, E	Touring, 4	1,600	4	25.60	120	34x4	Right
Corbitt, F	Touring, 5	1,650	4	25.60	120	34x4	Right
Correja, H	Roadster, 2	$1,800	6	33.75	128	34x4	Left
Correja, H	Touring, 5	1,800	6	33.75	128	34x4	Left
Crow Elkhart, D-52	Roadster, 2	1,575	4	28.90	120	34x4	Right
Crow Elkhart, D-54	Touring, 4	1,625	4	28.90	120	34x4	Right
Crow Elkhart, D-55	Touring, 5	1,600	4	28.90	120	34x4	Right
Crow Elkhart, D-56	Touring, 6	1,650	4	28.90	120	34x4	Right
Davis, 35K	Roadster, 2	1,335	4	19.60	112	33x4	Left
Davis, 35J	Touring, 5	1,335	4	19.60	112	33x4	Left
Davis, 50A	Touring, 5	1,985	4	32.40	118	37x4½	Right
Day Utility, D	Convertible, 5	1,500	4	25.60	116	34x4½	Right
Enger, C	Roadster, 2	1,285	4	32.40	120	34x4	Right
Enger, A	Touring, 5	1,285	4	32.40	120	34x4	Right
Fal	Roadster, 2	1,600	4	28.90	116	34x4	Right
Fal	Touring, 4 and 5	1,600	4	28.90	116	34x4	Right
Glide, 36-42	Roadster, 2	1,840	4	27.25	118	34x4	Left
Glide, 36-42	Touring, 5	1,840	4	27.25	118	34x4	Left
Great Southern, 50	Touring, 7	1,750	4	43.05	128	36x4½*	Right
Great Western, 1914	Touring, 4 and 5	1,710	4	28.90	118	36x4	Right
Great Western, 1914	Roadster, 2	1,710	4	28.90	118	36x4	Right
Havers, 6-44	Roadster, 2	1,985	6	33.75	122	36x4	Right
Havers, 6-44	Touring, 5	1,985	6	33.75	122	36x4	Right
Haynes, 28-M	Touring, 4 and 5	1,985	4	28.90	118	34x4	Left
Haynes, 28-R	Roadster, 2	1,985	4	28.90	118	34x4	Left
Henderson, DeLuxe	Roadster, 2	1,785	4	27.25	116	35x4½	Left
Henderson, DeLuxe	Touring, 5	1,585	4	27.25	116	35x4½	Left
Henderson, DeLuxe	Touring, 5	1,785	4	27.25	116	35x4½	Left
Herreshoff, 4-30	Roadster, 2 and 3	1,250	4	18.25	110	32x3½	Left
Herreshoff, 4-30	Touring, 5	1,350	4	18.25	110	32x3½	Left
Herreshoff, 4-30	Coupe, 2	1,650	4	18.25	110	32x3½	Left
Herreshoff, 6-40	Roadster, 2	1,850	6	27.25	124	34x4	Left
Herreshoff, 6-40	Touring, 4, 5 and 6	1,850	6	27.25	124	34x4	Left
Herreshoff, 6-40	Touring, 7	1,900	6	27.25	124	34x4	Left
Hupmobile, 32	Coupe, 3	1,350	4	16.90	106	33x4	Right
Hudson, 6-40	Roadster, 2	1,750	6	29.40	123	34x4	Left
Hudson, 6-40	Phaeton, 6	1,750	6	29.40	123	34x4	Left

*Rear tires only; front tires are a size smaller

Motor Cars Costing from $1,250 to $1,999—Continued

NAME AND MODEL	Body Style and Seating Capacity	Price	No. of Cylinders	S. A. E. H. P.	Wheelbase Inches	Tire Size Inches	Location of Steering
Hudson, 6-40	Cabriolet, 2	$1,950	6	29.40	123	34x4	Left
Illinois, K-14	Touring, 5	1,400	4	28.90	120	37x4	Right
Imperial, 32	Roadster, 2	1,500	4	28.90	114	34x4	Left
Imperial, 32	Touring, 5	1,500	4	28.90	114	34x4	Left
Imperial, 34	Roadster, 2	1,650	4	32.40	118	34x4	Right
Imperial, 34	Touring, 5	1,650	4	32.40	118	34x4	Right
Jackson, Olympic	Roadster, 2	1,525	4	27.25	115	34x4	Right
Jackson, Olympic	Touring, 5	1,385	4	27.25	115	34x4	Right
Jackson, Majestic	Touring, 5	1,885	4	32.40	124	36x4	Right
Jeffery, 93	Roadster, 2	1,550	4	22.50	116	34x4	Left
Jeffery, 93	Touring, 5	1,550	4	22.50	116	34x4	Left
Jeffery, 93	Coupelet, 2	1,950	4	22.50	116	34x4	Left
Kisselkar, 40-4	Roadster, 2	1,850	4	32.40	121	36x4	Left
Kisselkar, 40-4	Touring, 5	1,850	4	32.40	121	36x4	Left
Klinekar, 4-30	Touring, 4 and 5	1,685	4	25.60	125	34x4	Right
Klinekar, 4-40	Runabout, 2	1,985	4	29.71	120	36x4	Left
Klinekar, 4-40	Touring, 4 and 5	1,985	4	29.71	120	36x4	Left
Lambert, 60-C	Touring, 5	395	4	27.25	115	34x3½	Right
Lewis, Six	Touring, 6	1,600	6	29.40	135	36x4	Left
Marathon, Winner	Roadster, 2	1,300	4	28.90	118	34x4	Right
Marathon, Winner	Touring, 5	1,325	4	28.90	118	34x4	Right
Marathon, Champion	Roadster, 2	1,470	4	32.60	126	36x4	Right
Marathon, Champion	Touring, 7	1,495	4	32.60	126	36x4	Right
Marion, B	Roadster, 2	1,650	4	25.60	117	34x4	Left
Marion, B	Speedster, 2	1,650	4	25.60	117	34x4	Left
Marion, B	Touring, 5	1,650	4	25.60	117	34x4	Left
Maxwell, 50-6	Touring, 7	1,975	6	40.90	130	36x4½	Optional
Meteor, F-40	Touring, 5	1,275	4	25.60	118	34x3½	Right
Meteor. W	Touring, 5	1,600	6	33.60	122	35x4	Right
Metropol, C	Speedster, 2	1,350	4	28.90	115	33x4	Right
Metropol, C	Touring, 4	1,500	4	28.90	115	33x4	Right
Mitchell, Four	Roadster, 2	$1,595	4	28.90	120	36x4½	Left
Mitchell, Four	Touring, 4 and 5	1,595	4	28.90	120	36x4½	Left
Mitchell, Six	Roadster, 2	1,895	6	43.80	132	36x4½	Left
Mitchell, Six	Touring, 4 and 5	1,895	6	43.80	132	36x4½	Left
Moon, 42	Roadster, 2	1,750	4	32.40	118	34x4	Left
Moon, 42	Touring, 4 and 5	1,750	4	32.40	118	34x4	Left
Oakland, 36	Cabriolet, 2	1,585	4	19.60	112	33x4	Left
Oakland, M-48	Touring, 5	1,785	6	29.40	123½	35x4½	Left
Ohio, Ohio	Roadster, 2	1,275	4	28.90	116	34x4	Right
Ohio, Ohio	Touring, 5	1,275	4	28.90	116	34x4	Right
Ohio, Royal	Roadster, 2	1,985	6	38.40	132	35x4½	Left
Ohio, Royal	Touring, 5	1,985	6	38.40	132	35x4½	Left
Overland, 79	Coupe, 4	1,550	4	27.25	114	33x4	Right
Paige, 36	Roadster, 3	1,275	4	25.60	116	34x4	Left
Paige, 36	Touring, 5	1,275	4	25.60	116	34x4	Left
Paige, 36	Coupe, 4	1,850	4	25.60	116	34x4	Left
Paige, 36	Sedan, 5	1,950	4	25.60	116	34x4	Left
Pullman, 4-36	Touring, 5	1,575	4	27.10	118	34x4	Optional
Pullman-4-44	Touring, 5	1,975	4	30.63	122	36x4	Left
Regal, NC	Coupe, 3	1,600	4	22.50	108	33x4	Left
Regal, C	Touring, 5	1,350	4	25.60	116	34x4	Left
Richmond, R	Touring, 5	1,250	4	27.25	114	34x4	Right
Richmond, S	Touring, 5	1,350	4	32.40	117	34x4	Right
Richmond, T	Touring, 5	1,500	6	38.40	123	34x4	Right
Spaulding, H.	Touring, 5	1,875	4	28.90	120	36x4	Left
Staver, 45-A	Touring, 5	1,885	4	32.40	120	34x4	Left
Studebaker, Six	Landau Roadster2	1,950	6	29.40	121	34x4	Left
Studebaker, Six	Touring, 7	1,575	6	29.40	121	34x4	Left
Tribune, A	Touring, 5	1,600	4	28.90	118	34x4	Left
Velie, 4-35	Touring, 5	1,500	4	25.60	113	34x4	Left

*Rear tires only; front tires are a size smaller

Motor Cars for 1914 Costing from $2,000 to $2,999

THE class of the medium-priced cars costing between $2,000 and $3,000 comprises 170 different models manufactured by sixty makers. These include seventy-one touring cars of four-, five-, six- and seven-passenger capacity and nineteen inclosed cars seating anywhere from two to seven people. In addition there are forty-four roadsters.

It is in this class that sixes make the strongest showing, 111 of the cars being equipped with a six-cylinder motor and fifty-nine with four-cylinder engines. If all the cars selling around the $2,500 mark were boiled down into one car, its general specifications would be something like this: price, $2,460; horsepower, 35.22; wheelbase, 125.8; tires, 35 by 4½ inches. The engine might be either a six- or a four-cylinder creation; if a six, its motor dimensions would be about 3.07 inches bore and the stroke about 5¾ inches. If a four-cylinder, its bore would be about 4.07 and its stroke about 5.5 inches.

Most of the cars as produced for the new year for the American market have the steering wheel located on the left side, usually with the gearshift and emergency brake levers in the center. This location of the driver is comparatively new in America, having been adopted within the last three years; before that time only one or two makers had fitted the left drive as standard, the location of the steering column on the right being almost universal. The cars selling between $2,000 and $3,000 perhaps represent this new tendency toward left drive better than any other.

In this class in particular there are 108 car models with the left drive as against only fifty-two models with the right-side position. Many makers will fit either right or left drive as preferred by the purchaser. The central location of the gearshift lever, which is the rule, makes this particularly easy. Among the car names appearing for the first time are the Lyons-Knight, Mondex-Magic, S & M and Vaughan.

NAME AND MODEL	Body Style and Seating Capacity	Price	No. of Cylinders	S. A. E. H. P.	Wheelbase Inches	Tire Size Inches	Location of Steering
Abbott-Detroit, 34-40, K	Coupe, 4	$2,250	4	27.25	116	34x4	Right
Abbott-Detroit, 44-50, L	Roadster, 3	2,085	4	32.40	121	36x4½	Right
Abbott-Detroit, 44-50	Touring, 4 and 7	2,085	4	32.40	121	36x4½	Right
Abbott-Detroit, Belle Isle	Roadster, 3	2,290	6	33.75	130	35x4½	Left
Abbott-Detroit, Belle Isle	Touring, 7	2,290	6	33.75	130	35x4½	Left
American, 6-46	Roadster, 2	2,750	6	43.80	140	38x4½	Right
American, 6-46	Touring, 4	2,750	6	43.80	140	38x4½	Right
American, 6-44	Roadster, 2		6	43.35	132	38x4½	Right
American, 6-44	Touring		6	43.35	132	38x4½	Right
Apperson, 4-45	Coupe, 4	2,350	4	32.40	116	34x4	Left
Apperson, 4-45	Sedan, 5	2,500	4	32.40	120	36x4	Left
Apperson, 6-45	Touring, 5	2,200	6	33.75	128	36x4	Left
Apperson, 6-45	Roadster, 2	2,200	6	33.75	120	36x4	Left
Apperson, 6-55	Roadster, 2	$2,350	6	43.80	120	37x4½	Left
Apperson, 6-55	Touring, 5	2,350	6	43.80	128	37x4½	Left
Auburn, 6-45	Touring, 5	2,000	6	33.75	130	37x4½	Right
Auburn, 6-45	Touring, 6	2,100	6	33.75	130	37x4½	Right
Auburn, 6-45	Roadster, 2	2,000	6	33.75	130	37x4½	Right
Cadillac, 1914	Touring, 7	2,075	4	32.60	120	36x4½	Right
Cadillac, 1914	Coupe, 3	2,500	4	32.60	120	36x4½	Right
Cadillac, 1914	Limousine, 5	2,800	4	32.60	120	36x4½	Right
Cartercar, 5	Sedan, 5	2,000	4	27.25	116	36x4	Right
Case, 40	Touring, 5	2,300	4	32.40	124	37x4½	Right
Case, 40	Touring, 7	2,500	4	32.40	124	37x4½	Right

*Rear tires only; front tires are a size smaller

Motor Cars Costing from $2,000 to $2,999—Continued

NAME AND MODEL	Body Style and Seating Capacity	Price	No. of Cylinders	S. A. E. H. P.	Wheelbase Inches	Tire Size Inches	Location of Steering
Chalmers, 24	Roadster, 3	$2,175	6	38.40	132	36x4½	Left
Chalmers, 24	Touring, 4 and 5	2,175	6	38.40	132	36x4½	Left
Chalmers, 24	Touring, 6	2,275	6	38.40	132	36x4½	Left
Chalmers, 24	Coupe, 3	2,850	6	38.40	132	36x4½	Left
Colby, 6-C	Roadster, 2	2,500	6	40.90	136	37x5	Right
Colby, 6-C	Touring, 7	2,500	6	40.90	136	37x5	Right
Cole, Four	Coupe, 3	2,350	4	28.90	120	34x4½	Left
Cole, Six	Roadster, 2	2,600	6	43.80	136	36x4½	Left
Cole, Six	Touring, 6 and 7	2,600	6	43.80	136	36x4½	Left
Correja, H	Touring, 6	2,100	6	33.75	128	34x4	Left
Croxton	Touring, 4	2,500	4	27.25	121	36x4½	Left
Crow-Elkhart, D-62	Roadster, 2	2,225	6	33.75	130	36x4	Right
Crow-Elkhart, D-64	Touring, 4	2,275	6	33.75	130	36x4	Right
Crow-Elkhart, D-65	Touring, 5	2,250	6	33.75	130	36x4	Right
Crow-Elkhart, D-66	Touring, 6	2,300	6	33.75	130	36x4	Right
Davis, 6-50	Touring, 5	2,150	6	33.75	128	37x4½	Left
Davis, 6-50	Touring, 6	2,185	6	33.75	128	37x4½	Left
DeSoto	Touring, 5	2,185	6	38.40	132	36x4	Optional
Dorris, I	Touring, 4 and 5	2,500	4	30.63	121	36x4½	Left
Dorris, I	Touring, 6 and 7	2,550	4	30.63	121	36x4½	Left
Fal, Grayhound	Roadster, 2	2,500	4	28.90	114	34x4	Right
Franklin, 6-30	Roadster, 3	2,300	6	31.60	120	34x4½	Left
Franklin, 6-30	Touring, 5	2,300	6	31.60	120	34x4½	Left
Franklin, 6-30	Coupe, 3	2,950	6	31.60	120	34x4½	Left
Havers, 6-60	Roadster, 2	2,485	6	40.90	128	36x4½	Right
Havers, 6-60	Touring, 5	2,485	6	40.90	128	36x4½	Right
Haynes, 28-P	Coupe, 4	2,700	4	28.90	118	34x4	Left
Haynes, 26	Roadster, 2	2,700	6	43.80	130	36x4½	Left
Haynes, 26	Touring, 4 and 5	2,700	6	43.80	130	36x4½	Left
Haynes, 27	Touring, 6 and 7	2,785	6	43.80	136	36x4½	Left
Henderson DeLuxe	Coupe, 3	2,285	4	27.25	116	35x4½	Left
Henderson, Six	Roadster, 2	2,285	6	33.75	126	35x4½	Left
Henderson, Six	Touring, 5	2,285	6	33.75	126	35x4½	Left
Henderson, Six	Coupe, 3	2,785	6	33.75	126	35x4½	Left
Holly, A-1	Roadster, 2	2,750	6	38.40	130	35x4½	Left
Holly, A-1	Touring, 5, 6 & 7	2,750	6	38.40	130	35x4½	Left
Howard, D	Touring, 5	2,375	6	40.90	130	36x4½	Left
Hudson, Six-54	Phaeton, 7	2,250	6	40.90	135	36x4½	Left
Imperial, 44-6	Touring, 5	2,000	6	33.75	126	36x4½	Left
Imperial, 54-6	Touring, 7	2,500	6	40.90	137	36x4½	Left
Inter-State, 45	Touring, 5	2,750	6	38.40	132	36x4½	Left
Jackson, Sultanic	Touring, 5	2,150	6	40.90	132	36x4½	Right
Jackson, Sultanic	Touring, 7	2,300	6	40.90	132	36x4½	Right
Jeffery, 93	Sedan, 4	2,350	4	22.50	116	34x4	Left
Jeffery, 96	Roadster, 2	2,250	6	33.75	128	36x4½	Left
Jeffery, 96	Touring, 5	2,250	6	33.75	128	36x4½	Left
Jeffery, 93	Touring, 6	2,300	6	33.75	128	36x4½	Left
Kisselkar, 40-4	Coupe, 5	2,500	4	32.40	121	36x4	Left
Kisselkar, 48-6	Roadster, 2	2,350	6	33.75	132	36x4½	Left
Kisselkar, 48-6	Touring, 5	2,350	6	33.75	132	36x4½	Left
Klinekar, 6-60	Roadster, 2	2,985	6	44.88	133	37x5	Left
Klinekar, 6-60	Touring, 4, 6 & 7	2,985	6	44.88	133	37x5	Left
Klinekar, 6-60	Coupe, 2	2,985	6	44.88	133	37x5	Left
Klinekar, 4-40	Coupe, 2	2,585	4	29.71	120	36x4	Left
Klinekar, 6-50	Roadster, 2	2,585	6	40.90	128	36x4½	Left
Klinekar, 6-50	Touring, 4 and 5	2,585	6	40.90	128	36x4½	Left
Klinekar, 6-60	Touring, 4, 6 & 7	2,985	6	44.88	133	37x5	Left
Klinekar, 6-60	Coupe, 2	2,985	6	44.88	133	37x5	Left
Klinekar, 6-60	Runabout, 2	2,985	6	44.88	133	37x5	Left
Lenox, D	Roadster, 2	2,100	4	28.90	118	34x4½	Left
Lenox, C	Roadster, 3	2,000	4	28.90	118	34x4½	Left
Lenox, A & B	Touring, 4 and 5	2,000	4	28.90	118	34x4½	Left
Lenox, M & N	Touring, 4 and 6	2,750	6	38.60	130	34x4½	Left
Lozier, Four	Roadster, 2		4	28.90	120	36x4½	Left
Lozier, Four	Touring, 5 and 7		4	28.90	120	36x4½	Left
Luverne, 7-60	Touring, 7	2,500	6	38.60	130	36x4½	Left
Lyons-Knight, K-4	Touring, 5	2,900	4	32.40	130	37x5	Left
Lyons-Knight, K-4	Touring, 7	2,980	4	32.40	130	37x5	Left
Marion, G	Roadster, 2	2,150	6	33.75	124	35x4½	Left
Marion, G	Touring, 5	2,150	6	33.75	124	35x4½	Left
Marion, G	Coupe, 4	2,650	6	33.75	124	35x4½	Left
Marion, G	Sedan, 5	2,950	6	33.75	124	35x4½	Left
Marion, B	Coupe, 4	2,150	4	25.60	117	34x4	Left
Marmon, 32	Speedster, 2	2,850	4	32.40	120	35x4½	Left
Marmon, 32	Roadster, 2	2,900	4	32.40	120	35x4½	Left
McFarlan, T	Roadster, 2	2,590	6	38.40	128	36x4½	Left
McFarlan, T	Tour., 4, 5, 6 & 7	2,590	6	38.40	128	36x4½	Left
Mercer, J	Racebout, 2	$2,600	4	30.63	108	32x4	Right
Mercer, H	Touring, 5	2,900	4	32.40	118	34x4	Right
Mercer, O	Runabout, 2	2,900	4	32.40	118	34x4	Right
Mitchell, Big Six	Touring, 7	2,350	6	43.80	144	37x5	Left
Moline, Knight	Touring, 5 and 7	2,400	4	25.60	128	36x4½	Left
Moon, 42	Coupe, 3	2,250	4	32.40	118	34x4	Left
Moon, 6-50	Roadster, 2	2,150	6	33.75	129	35x4½	Left
Moon, 6-50	Touring, 5	2,150	6	33.75	129	35x4½	Left
Moon, 6-50	Touring, 4 and 6	2,225	6	33.75	129	35x4½	Left
Moon, 6-50	Coupe, 3	2,750	6	33.75	129	35x4½	Left
Moyer, E	Roadster, 2	2,400	4	32.40	121	34x4	Right
Moyer, E	Touring, 5	2,500	4	32.40	121	34x4	Right
National, 40	Roadster, 2	2,750	4	38.00	120	36x4½	Left
National, Six	Touring, 4 and 5	2,375	6	33.75	132	36x4½	Left
Norwalk, D	Roadster, 2	2,685	6	36.06	131	37x4	Left
Norwalk, D	Touring, 4	2,685	6	36.06	131	37x4	Left
Norwalk, D	Touring, 6	2,785	6	36.06	131	37x4	Left
Oldsmobile, 54	Touring, 5	2,975	6	43.80	132	36x5	Right
Palmer-Singer	Runabout, 2	2,295	6	38.40	128	36x4½	Right
Palmer-Singer	Touring, 5	2,295	6	38.40	128	36x4½	Right
Palmer-Singer, 50	Road and Tour.	2,495	6	38.40	134	36x4½	Left
Pathfinder, 14	Roadster, 2	2,160	4	27.25	120	35x4½	Right
Pathfinder, 14	Cruiser, 2	2,175	4	27.25	120	35x4½	Right
Pathfinder, 14	Touring, 5	2,185	4	27.25	120	35x4½	Right
Pathfinder, 14	Coach, 3	2,500	4	27.25	120	35x4½	Right
Pathfinder, Leather Stock	Touring, 6 and 7	2,750	6	40.90	135	35x5	Left
Pathfinder, Daniel Boone	Touring, 5	2,222	6	33.75	125	34x4½	Left
Pathfinder, Daniel Boone	Touring, 7	2,275	6	33.75	125	34x4½	Left
Pathfinder, Daniel Boone	Cabriolet, 2	2,222	6	33.75	125	34x4½	Left
Pilot, 50	Road and Tour.	2,250	4	32.40	120	37x4½	Optional
Pilot, 50	Roadster, 2	2,500	4	32.40	126	37x4½	Optional
Pilot, 50	Tour., 4, 5, 6 & 7	2,500	4	32.40	126	37x4½	Optional
Pilot, 60	Roadster, 2	2,785	6	38.40	132	37x4½	Optional
Pilot, 60	Tour, 4, 5, 6 & 7	2,785	6	38.40	132	37x4½	Optional
Pope-Hartford, 35	Roadster, 2	2,250	4	29.76	118½	36x4½	Left
Pope-Hartford, 35	Touring, 5	2,250	4	29.76	118½	36x4½	Left
Pratt, 4-50	Roadster, 2	2,100	4	32.40	122	36x4	Right
Pratt, 4-50	Touring, 4 and 5	2,150	4	32.40	122	36x4	Right
Pratt, 4-50	Touring, 7	2,300	4	32.40	122	36x4	Right
Premier	Roadster, 2		6	31.60	132	36x4½	Left
Premier	Touring, 5		6	31.60	132	36x4½	Left
Premier, 6-48	Roadster, 2	2,785	6	38.40	132	36x4½	Left
Premier, 6-48	Touring, 5	2,785	6	38.40	132	36x4½	Left
Premier, 6-48	Touring, 7	2,900	6	38.40	132	36x4½	Left
Pullman, 6-66	Touring, 7	2,850	6	45.95	138	37x5	Left
Pullman, 6-46	Touring, 4 and 5	2,400	6	35.75	130	36x4½	Left
Rayfield, D	Roadster, 2	2,600	6	38.40	130	36x4½	Right
Rayfield, D	Touring, 4, 5 and 6	2,600	6	38.40	130	36x4½	Right
Rayfield, D	Coupe	2,750	6	38.40	130	36x4½	Right
Republic	Touring, 5 and 7	2,950	6	43.80	133	36x4½	Left
S. & M., 14-48	Roadster, 2	2,485	6	33.75	130	34x4½	Left
S. & M., 14-48	Touring, 5	2,485	6	33.75	130	34x4½	Left
S. & M., 14-48	Touring, 7	2,535	6	33.75	130	34x4½	Left
Selden, 49	Runabout, 3	2,500	4	36.10	125	36x4	Right
Selden, 49	Touring, 5	2,500	4	36.10	125	36x4	Right
Speedwell, H	Touring, 4 and 5	2,850	6	40.90	135	37x5	Left
Speedwell, H	Touring, 7	2,950	6	40.90	135	37x5	Left
Speedwell, Rotary	Touring, 4	2,850	6	40.90	135	36x4½	Left
Speedwell, Rotary	Touring, 5 and 7	2,950	6	40.90	135	37x5	Left
Staver, 65-A	Touring, 7	2,550	6	38.40	138	37x4½	Left
Studebaker, Six	Sedan, 5	2,250	6	29.40	121	34x4	Left
Stutz, 4-E	Touring, 6	2,150	4	35.10	130	34x4½	Right
Stutz, 4-E	Roadster, 2	2,000	4	36.10	120	36x4½	Right
Stutz, 4-E	Bearcat, 2	2,000	4	36.10	120	36x4½	Right
Stutz, 4-E	Coupe, 3	2,600	4	36.10	120	36x4½	Right
Stutz, 6-E	Touring, 6	2,400	6	38.40	130	34x4½	Right
Stutz, 6-E	Roadster, 2	2,250	6	38.40	120	34x4½	Right
Stutz, 6-E	Bearcat, 2	2,250	6	38.40	120	34x4½	Right
Stutz, 6-E	Coupe, 3	2,850	6	38.40	120	34x4½	Right
Vaughan	Roadster, 2	2,850	6	33.75	138	35x4½	Left
Vaughan	Touring, 6	2,800	6	33.75	138	35x4½	Left
Vaughan	Touring, 4	2,750	6	33.75	138	35x4½	Left
Velie, 4-45	Roadster, 2	2,000	4	34.25	121	36x4	Left
Velie, 4-45	Touring, 4 and 5	2,000	4	34.25	121	36x4	Left
Velie, 5-50	Roadster, 2	2,350	6	33.75	126	37x4½	Left
Velie, 6-50	Touring, 4 and 5	2,350	6	33.75	126	37x4½	Left
White, G. A. F	Roadster, 2	2,500	4	22.50	110	34x4	Left
White, G. A. F	Touring, 5	2,500	4	22.50	110	34x4	Left
Willys-Knight	Roadster, 2		4	25.60	120	36x4½	Left
Willys-Knight	Touring, 5		4	25.60	120	36x4½	Left
Zimmerman, B-6	Touring	2,185	6	38.40	132	36x4	Optional

*Rear tires only; front tires are a size smaller

Motor Cars for 1914 Season Costing More than $3,000

FOR prospective purchasers of 1914 American cars of the highest class, those which list from $3,000 upward, the range of choice is wider than it is for those whose means are more limited. In the matter of price alone, stock models are offered at prices as high as $7,200. Motorists who prefer more special fittings and bodies built and equipped to their own specifications may pay as much more than that figure as they desire.

The cars in this class, the cream of the American market, are represented by no less than 250 distinct stock models; these are the product of forty-six different factories and over one-half of the different models offered are equipped with inclosed bodies of some type, either the coupe, limousine, landaulet, berline, brougham or sedan. There are 128 different models of inclosed cars in this class, the majority of which are of the limousine type.

Roadsters and the other open types of two passenger cars do not figure so prominently in this class as in the others. There are only twenty-eight of these, and likewise the open touring cars are not offered in as many different styles as they are in the less expensive market, not more than sixty-two being listed.

If this cream of the American cars were concentrated into a single car, one probably would find that it was represented by a limousine of lines and appointments that show the greatest advancement in the body builder's art. It probably would have an adaptation of the streamline effect in which the sides and rear body panels are made to meet with the roof in a long sweeping curve, so that the line of demarkation between the two is almost imperceptible. The windows would be found exceptionally large and without dividing lines, perhaps curved. To conform to the sweeping curves of the panels to decrease the wind resistance and give an idea of speed, the forward pane corresponding with the windshield possibly would be curved.

In the matter of interior fittings, this car would be found to be upholstered in some type of Bedford cord or, as it is known in America, motor cord. Perhaps the interior paneling would be deeply tufted. The interior, as well as the exterior, would be electrically illuminated, the inside having a dome light in the top, with perhaps disappearing lights in rear corners and an automatic step light which illuminates the running board when the door is open. In addition there would be a telephone to the driver's seat, so that passengers could communicate with the driver. It also would be equipped with a complete, yet compact, outfit of toilet articles for Milady's beautification and a cut-glass flower vase or two—perhaps even an umbrella holder.

Mechanically, the car would be as perfect in its design as the body is in its appointments. In general, the average of these higher-priced cars will sell at $4,700 and will have a horsepower of 40.5, a wheelbase of 132 inches and 36 by 5-inch tires. The chances are two to one that it will be a six-cylinder car.

As it is generally used, the term limousine, applies to a car body that is permanently inclosed behind the driver's seat. The closed part is glazed in front and rear and at the sides and entrance thereto is gained through a door on each side. The driver's seat is open and the roof is extended forward well over it and joined by a glass windshield arising from the dash. The main inclosed seat usually accommodates three, while accommodations for two more passengers generally are provided by chair seats in front of the main seat.

The landaulet is similar to the limousine except that part of the inclosed portion behind the doors is collapsible, folding up or sliding out of the way, so that the car may be used as a closed or open one at will. The coupe is a short, permanently inclosed body, usually seating only two. The brougham originally was the same, but is now applied more generally to the bodies of this type seating more than three. In the brougham and coupe the occupants are all in the same inclosure.

The berlin, or berline, body is a derivative of that seen in the days of primitive Berlin. This German body had a separate compartment for the driver and this same arrangement is to be found on the berlin bodies of today. The sedan is a single-compartment body of larger capacity than the coupe in which the driver and passengers are in the same compartment. It often is used interchangeably with brougham. The town car is a limousine or landaulet of short wheelbase, quick acceleration and short turning radius designed for work in town where traffic conditions are crowded.

NAME AND MODEL	Body Style and Seating Capacity	Price	No. of Cylinders	S. A. E. H. P.	Wheelbase Inches	Tire Size Inches	Location of Steering
Abbott-Detroit, 44-50 L.	Limousine, 7	$3,150	4	32.40	121	36x4½	Right
Abbott-Detroit, Belle Isle	Limousine, 7	3,500	6	33.75	130	35x4½	Left
Austin, 55	Runabout, 2	4,000	4	38.40	141½	37x5	Left
Austin, 55	Touring, 5 and 7	4,000	4	38.40	141½	37x5	Left
Austin, 55	Limousine, 7	5,000	4	38.40	141½	37x5	Left
Austin, 77	Runabout, 2	6,000	6	48.60	141½	37x5	Left
Austin, 77	Touring, 5 and 7	6,000	6	48.60	141½	37x5	Left
Austin, 77	Limousine, 7	7,000	6	48.60	141½	37x5	Left
Cadillac, 1914	Limousine, 7	3,250	4	32.60	120	36x4½	Right
Chadwick, 19	Roadster, 2	5,500	6	60.00	112	36x4½	Right
Chadwick, 19	Touring, 5 and 7	5,500	6	60.00	133	37x5*	Right
Chadwick, 19	Limousines, 7	6,500	6	60.00	133	37x5*	Right
Chalmers, 24	Limousine, 7	[3,600]	6	38.40	132	36x4½	Left
Cole, Six	Coupe, 4	3,000	6	43.80	136	36x4½	Left
Cole, Six	Limousine, 7	4,000	6	43.80	136	36x4½	Left
Crane, 4	Chassis only	8,000	6	45.95	136½	37x5*	Left
Cunningham, M.	Runabout, 2	3,500	4	36.10	124	36x4½	Left
Cunningham, M.	Touring, 4 & 5	3,750	4	36.10	124	36x4½	Left
Cunningham, M.	Touring, 7	3,750	4	36.10	124	36x4½	Left
Cunningham, M.	Limousine, 7	4,900	4	36.10	124	36x4½	Left
Cunningham, M.	Landaulet, 7	5,000	4	36.10	124	36x4½	Left
Cunningham, M.	Berline, 7	5,000	4	36.10	124	36x4½	Left
Dorris, I	Limousine, 7	3,000	4	30.63	121	36x4	Left
Fiat, 54	Touring, 5 and 7	4,000	4	30.00	123	36x4½	Right
Fiat, 54	Roadster, 2 and 3	4,000	4	30.00	123	36x4½	Right
Fiat, 54	Limousine, 7	5,000	4	30.00	123	36x4½	Right
Fiat, 54	Landaulet, 7	5,100	4	30.00	123	36x4½	Right
Fiat, 54	Berline, 7	5,300	4	30.00	123	36x4½	Right
Fiat, 55	Touring, 5 and 7	4,500	4	42.00	128	37x5*	Right
Fiat, 55	Roadster, 3	4,500	4	42.00	128	37x5*	Right
Fiat, 55	Limousine, 7	5,500	4	42.00	128	37x5*	Right
Fiat, 55	Landaulet, 7	$5,600	4	42.00	128	37x5*	Right
Fiat, 55	Berline, 7	5,800	4	42.00	128	37x5*	Right
Fiat, 56	Touring, 5 and 7	5,000	6	45.00	135	37x5*	Right
Fiat, 56	Roadster, 2 and 3	5,000	6	45.00	135	37x5*	Right
Fiat, 56	Limousine, 7	6,000	6	45.00	135	37x5*	Right
Fiat, 56	Landaulet, 7	6,100	6	45.00	135	37x5*	Right
Fiat, 56	Berline, 7	6,300	6	45.00	135	37x5*	Right
Firestone-Columbus, 86E	Roadster, 3		4	27.25	130	34x4	Left
Firestone-Columbus, 86E	Touring, 5		4	27.25	130	34x4	Left
Firestone-Columbus, 86E	Coupe, 3		4	27.25	130	34x4	Left
Firestone-Columbus, 69D	Racebout, 2		4	32.40	122	34x4	Left
Firestone-Columbus, 60E	Touring, 5 and 7		4	32.40	122	36x4	Left
Firestone-Columbus, 60E	Limousine, 7		4	32.40	122	36x4	Left
Firestone-Columbus, 90E	Touring, 5 and 7		6	40.90	130	36x4½	Left
Franklin, 6-30	Sedan, 5	3,200	6	31.60	120	34x4½	Left
Franklin, 6-30	Limousine, 5	3,300	6	31.60	120	34x4½	Left
Franklin, 6-30	Berlin, 5	3,400	6	31.60	120	34x4½	Left
Great Eagle, B	Touring, 7	3,500	4	36.10	135	37x5	Left
Great Eagle, B	Limousine, 7	4,000	4	36.10	135	37x5	Left
Great Eagle, B	Limousine, 10	4,250	4	36.10	135	37x5	Left
Haynes, 26P	Coupe, 4	3,200	6	43.80	130	36x4½	Left
Haynes, 27L	Limousine, 7	3,850	6	43.80	136	36x4½	Left
Hudson, Six, 54	Sedan, 5	3,100	6	40.90	135	36x4½	Left
Jeffery, 93	Limousine, 5	3,000	4	22.50	116	34x4	Left
Jeffery, 96	Sedan, 5	3,250	6	33.75	128	36x4½	Left
Jeffery, 96	Limousine, 5	3,700	6	33.75	128	36x4½	Left
Kisselkar, 48-6	Sedan	3,000	6	33.75	132	36x4½	Left
Kisselkar, 48-6	Limousine, 7	4,100	6	33.75	132	36x4½	Left
Kisselkar, 60-6	Roadster, 2	3,150	6	48.60	142	37x5	Left
Kisselkar, 60-6	Touring, 7	3,150	6	48.60	142	37x5	Left
Kisselkar, 60-6	Limousine, 7	4,000	6	48.60	142	37x5	Left
Klinekar, 6-50	Coupe	3,200	6	40.90	128	37x4½	Left

*Rear tires only; front tires are a size smaller

Motor Cars Costing More than $3,000—Continued

NAME AND MODEL	Body Style and Seating Capacity	Price	No. of Cylinders	S. A. E. H. P.	Wheelbase Inches	Tire Size Inches	Location of Steering
Knox, 44	Touring, 5 and 7	$3,500	4	40.00	Opt	36x4½	Right
Knox, 44	Torpedo, 4	3,400	4	40.00	Opt	36x4½	Right
Knox, 44	Torpedo, 5	3,450	4	40.00	Opt	36x4½	Right
Knox, 44	Raceabout, 2, 3&4	3,550	4	40.00	Opt	36x4½	Right
Knox, 44	Limousine, 7	4,400	4	40.00	Opt	36x4½	Right
Knox, 44	Landaulet, 7	4,450	4	40.00	Opt	36x4½	Right
Knox, 46	Raceabout, 2, 3&4	4,500	6	45.95	134	38x5	Optional
Knox, 46	Torpedo, 6 and 7	4,500	6	45.95	134	38x5	Optional
Knox, 46	Limousine, 7	5,500	6	45.95	134	38x5	Optional
Knox, 46	Landaulet, 7	5,550	6	45.95	134	38x5	Optional
Knox, 45	Touring, 7	3,800	4	40.00	126	37x5	Optional
Knox, 45	Torpedo, 6 and 7	3,700	4	40.00	126	37x5	Optional
Knox, 45	Limousine, 7	4,700	4	40.00	126	37x5	Optional
Knox, 45	Landaulet, 7	4,750	4	40.00	126	37x5	Optional
Knox, 66	Touring, 6 and 7	5,000	6	60.00	134	38x5½	Optional
Locomobile, 38RD	Touring, 4 and 5	4,400	6	43.80	128	36x5	Right
Locomobile, 38LD	Touring, 4 and 5	4,400	6	43.80	132	36x5	Left
Locomobile, 38LD	Roadster, 2	4,400	6	43.80	132	36x5	Left
Locomobile, 38LD	Berline, Land, 7	5,800	6	43.80	132	36x5	Left
Locomobile, 38LD	Limousine, 7	5,400	6	43.80	132	36x5	Left
Locomobile, 38LD	Landaulet, 7	5,500	6	43.80	132	36x5	Left
Locomobile, 38LD	Coupe, 3	5,200	6	43.80	132	36x5	Left
Locomobile, 38LD	Beline, Lim., 7	5,700	6	43.80	132	36x5	Left
Locomobile, 48LD	Roadster, 2	5,100	6	48.60	140	37x5½*	Left
Locomobile, 48LD	Touring, 6 and 7	5,100	6	48.60	140	37x5½*	Left
Locomobile, 48LD	Limousine, 7	6,200	6	48.60	140	37x5½*	Left
Locomobile, 48LD	Landaulet, 7	6,300	6	48.60	140	37x5½*	Left
Locomobile, 48LD	Berline, Lim., 7	6,500	6	48.60	140	37x5½*	Left
Locomobile, 48LD	Berline, Land., 7	6,600	6	48.60	140	37x5½*	Left
Locomobile, 48RD	Touring, 4, 5 & 7	5,100	6	48.60	136	37x5 *	Right
Lozier, 77	Roadster, 2	3,250	6	36.06	127½	36x4½	Left
Lozier, 77	Touring, 5	3,250	6	36.06	127½	36x4½	Left
Lozier, 77	Limousine, 5 and 6	4,450	6	36.06	127½	36x4½	Left
Lozier, 77	Coupe, 3	3,850	6	36.06	127½	36x4½	Left
Lyons-Knight, K4	Sedan, 5	3,900	4	32.40	130	36x5	Left
Lyons-Knight, K4	Berlin, 7	4,300	4	32.40	130	36x5	Left
Marmon, 41	Roadster, 2		6	43.80	132	35x5	Left
Marmon, 41	Touring, 4 and 5		6	43.80	132	35x5	Left
Marmon, 41	Limousine, 7		6	43.80	132	35x5	Left
Marmon, 41	Landaulet, 7		6	43.80	132	35x5	Left
Marmon, 32	Touring, 4 and 5	3,000	4	32.40	120	35x4½	Left
Marmon, 32	Touring, 7	3,125	4	32.40	120	35x4½	Left
Marmon, 32	Limousine, 7	4,000	4	32.40	120	35x4½	Left
Marmon, 32	Landaulet, 3	4,100	4	32.40	120	35x4½	Left
Marmon, 48	Roadster, 3	5,000	6	48.60	145	37x5*	Left
Marmon, 48	Touring, 4, 5 & 7	5,000	6	48.60	145	37x5*	Left
Marmon, 48	Landaulet	6,350	6	48.60	145	37x5*	Left
Marmon, 48	Limousine, 7	6,450	6	48.60	145	37x5*	Left
Mercer, M-35	Touring, 5	3,000	4	32.40	124	35x4½*	Right
McFarlan, T	Coupe, 4	3,300	6	38.40	128	36x4½	Left
McFarlan, T	Limousine, 7	4,000	6	38.40	128	36x4½	Left
Mondex, Magic, 6-40	Touring, 4 and 6	4,500	6	27.40	134	36x4½	Left
Mondex, Magic, 6-40	Limousine, 6	6,500	6	27.40	134	36x4½	Left
Mondex, Magic, 6-60	Touring, 6	5,000	6	38.40	140	37x5	Left
Mondex, Magic, 6-60	Limousine, 6	6,000	6	38.40	140	37x5	Left
Morse, D	Roadster, 2	3,600	4	34.25	127	36x4½	Right
Morse, D	Touring, 4, 5 & 7	3,600	4	34.25	127	36x4½	Right
Moyer, G	Touring, 7	3,250	6	48.60	135	35x4½	Right
National, 40	Touring, 4 and 5	3,300	4	38.00	132	36x4½	Left
National, 40	Roadster, 2	3,150	4	38.00	132	36x4½	Left
National, 40	Touring, 7	3,400	4	38.00	132	36x4½	Left
National, 40	Coupe, 3	3,500	4	38.00	132	36x4½	Left
National, 40	Limousine, 7	4,800	4	38.00	132	36x4½	Left
Norwalk, D	Limousine, 6	4,000	6	36.06	131	37x4	Left
Norwalk, C	Roadster, 2	3,500	6	38.40	136	39x5	Left
Norwalk, C	Touring, 4 and 6	3,500	6	38.40	136	39x5	Left
Norwalk, C	Limousine, 6	5,000	6	38.40	136	39x5	Left
Oldsmobile, 54	Limousine, 7	4,300	6	43.80	132	36x5	Right
Oldsmobile, 54	Touring, 7	3,150	6	43.80	139	36x5	Right
Packard, 2-38	Runabout, 2	3,750	6	38.40	140	37x5*	Left
Packard, 2-38	Phaeton, 4 and 5	3,750	6	38.40	140	37x5*	Left
Packard, 2-38	Touring, 6 and 7	3,850	6	38.40	140	37x5*	Left
Packard, 2-38	Coupe, 3	4,450	6	38.40	140	37x5*	Left
Packard, 2-38	Brougham, 4	4,950	6	38.40	140	37x5*	Left
Packard, 2-38	Brougham, 6	5,000	6	38.40	140	37x5*	Left
Packard, 2-38	Limousine, 6	4,900	6	38.40	140	37x5*	Left
Packard, 2-38	Landaulet, 6	4,900	6	38.40	140	37x5*	Left
Packard, 2-38	Landaulet, 7	4,950	6	38.40	140	37x5*	Left
Packard, 2-38	Limousine, 7	4,950	6	38.40	140	37x5*	Left
Packard, 2-38	Landaulet, 7	5,000	6	38.40	140	37x5*	Left
Packard, 2-38	Limousine, 6 and 7	5,100	6	38.40	140	37x5*	Left
Packard, 2-38	Limousine, 7	5,150	6	38.40	140	37x5*	Left
Packard, 2-38	Limousine, 7	5,000	6	38.40	140	37x5*	Left
Packard, 2-38	Spec Six	3,350	6	38.40	140	37x5*	Left
Peerless, 38-Six	Roadster, 3	4,300	6	38.40	125	36x4½	Optional
Peerless, 38-Six	Touring, 4 and 5	4,300	6	38.40	125	36x4½	Optional
Peerless, 38-Six	Coupe, 3	5,000	6	38.40	125	36x4½	Optional
Peerless, 38-Six	Limousine, 7	5,300	6	38.40	125	36x4½	Optional
Peerless, 38-Six	Landaulet, 7	5,400	6	38.40	125	36x4½	Optional
Peerless, 38-Six	Berline, 7	5,500	6	38.40	125	36x4½	Optional
Peerless, 48-Six	Touring, 6 and 7	5,000	6	48.60	137	37x5*	Optional
Peerless, 48-Six	Limousine, 7	6,000	6	48.60	137	37x5*	Optional
Peerless, 48-Six	Landaulet, 7	6,100	6	48.60	137	37x5*	Optional
Peerless, 48-Six	Berline, 7	6,200	6	48.60	137	37x5*	Optional
Peerless, 60-Six	Touring, 6 and 7	6,000	6	60.00	140	38x5½	Optional
Peerless, 60-Six	Limousine, 7	7,000	6	60.00	140	38x5½	Optional
Peerless, 60-Six	Landaulet, 7	7,100	6	40.00	140	38x5½	Optional
Peerless, 60-Six	Berline, 7	7,200	6	60.00	140	38x5½	Optional
Pierce-Arrow, 38C-2	Runabout, 2	4,300	6	38.40	Opt	36x4½	Right
Pierce-Arrow, 38C-2	Touring, 4 and 5	4,300	6	38.40	Opt	36x4½	Right
Pierce-Arrow, 38C-2	Brougham, 7	5,200	6	38.40	Opt	36x4½	Right
Pierce-Arrow, 38C-2	Landaulet, 7	5,200	6	38.40	Opt	36x4½	Right
Pierce-Arrow, 38C-2	Brougham, 7	5,400	6	38.40	Opt	36x4½	Right
Pierce-Arrow, 38C-2	Landaulet, 7	5,400	6	38.40	Opt	36x4½	Right
Pierce-Arrow, 48B-2	Runabout, 2	4,850	6	48.60	Opt	37x5	Right
Pierce-Arrow, 48B-2	Touring, 4 and 5	4,850	6	48.60	Opt	37x5	Right
Pierce-Arrow, 48B-2	Touring, 7	5,000	6	48.60	Opt	37x5	Right
Pierce-Arrow, 48B-2	Suburban, 7	6,100	6	48.60	Opt	37x5	Right
Pierce-Arrow, 48B-2	Brougham, 5	5,800	6	48.60	Opt	37x5	Right
Pierce-Arrow, 48B2	Landaulet, 5	5,800	6	48.60	Opt	37x5	Right
Pierce-Arrow, 48B-2	Brougham, 5	6,000	6	48.60	Opt	37x5	Right
Pierce-Arrow 48B-2	Landaulet, 5	6,000	6	48.60	Opt	37x5	Right
Pierce-Arrow, 48B-2	Landau, 7	6,100	6	48.60	Opt	37x5	Right
Pierce-Arrow, 48B-2	Suburban, 7	6,300	6	48.60	Opt	37x5	Right
Pierce-Arrow, 48B-2	Landau, 7	6,300	6	48.60	Opt	37x5	Right
Pierce-Arrow, 66A-2	Runabout, 2	5,850	6	60.00	Opt	37x5	Right
Pierce-Arrow, 66A-2	Touring, 4 and 5	5,850	6	60.00	Opt	38x5½*	Right
Pierce-Arrow, 66A-2	Touring, 7	6,000	6	60.00	Opt	83x5½*	Right
Pierce-Arrow, 66A-2	Suburban, 7	7,100	6	60.00	Opt	38x5½*	Right
Pierce-Arrow, 66A-2	Landau, 7	7,100	6	60.00	Opt	38x5½*	Right
Pierce-Arrow, 66A-2	Suburban, 7	7,300	6	60.00	Opt	38x5½*	Right
Pierce-Arrow, 66A-2	Landau, 7	7,300	6	60.00	Opt	38x5½*	Right
Pierce-Arrow, 66A-2	Brougham, 5	6,800	6	60.00	Opt	38x5½*	Right
Pierce-Arrow, 66A-2	Landaulet, 5	6,800	6	60.00	Opt	38x5½*	Right
Pierce-Arrow, 66A-2	Brougham, 5	7,000	6	60.00	Opt	38x5½*	Right
Pierce, Arrow 66A-2	Landaulet, 5	7,000	6	60.00	Opt	38x5½*	Right
S. G. V., F	Runabout, 3	3,500	4	22.50	120	35x4½	Left
S. G. V., F	Touring, 4 and 5	3,500	4	22.50	120	35x4½	Left
S. G. V., F	Limousine, 7	4,250	4	22.50	120	35x4½	Left
S. G. V, F	Landaulet, 7	4,250	4	22.50	120	35x4½	Left
S. G. V., F	Brougham, 5	4,500	4	22.50	120	35x4½	Left
S. & M.-14-48	Touring, 7	3,750	6	33.75	130	34x4½	Left
Simplex, 38	Touring, 5	5,600	4	38.00	137	35x5	Right
Simplex	Touring, 7	5,700	4	38.00	137	35x5	Right
Simplex, 38	Limousine, 6	6,400	4	38.00	137	35x5	Right
Simplex, 38	Limousine, 7	6,500	4	38.00	137	35x5	Right
Simplex, 38	Landaulet, 6	6,400	4	38.00	137	35x5	Right
Simplex, 38	Landaulet, 7	6,500	4	38.00	137	35x5	Right
Simplex, D-1	Touring, 5	6,100	4	46.00	137	37x5*	Right
Simplex, D-1	Touring, 7	6,200	4	46.00	137	37x5*	Right
Simplex, D-1	Specials		4	46.00	129		Right
Spoerer, 40	Roadster, 2	3,000	4	38.00	120	37x4½	Right
Spoerer, 40	Touring, 5	3,000	4	38.00	120	37x4½	Right
Spoerer, 40	Touring, 7	3,200	4	38.00	120	37x4½	Right
Stearns-Knight, Four	Roadster, 3	3,750	4	28.90	121	36x4½	Left
Stearns-Knight, Four	Touring, 4 and 5	3,750	4	28.90	121	36x4½	Left
Stearns-Knight, Four	Coupe, 4	4,450	4	28.90	121	36x4½	Left
Stearns-Knight, Four	Touring, 6 and 7	3,900	4	28.90	127	37x5*	Left
Stearns-Knight, Four	Sedan, 5	5,000	4	28.90	127	37x5*	Left
Stearns-Knight, Four	Limousine, 7	5,000	4	28.90	127	37x5*	Left
Stearns-Knight, Four	Landaulet, 7	5,100	4	28.90	127	37x5*	Left
Stearns-Knight, Six	Roadster, 3	4,850	6	43.80	134	37x5	Left
Stearns-Knight, Six	Touring, 4 and 5	4,850	6	43.80	134	37x5	Left
Stearns-Knight, Six	Coupe, 4	5,550	6	43.80	134	37x5	Left
Stearns-Knight, Six	Sedan, 5	6,100	5	43.80	134	37x5	Left
Stearns-Knight, Six	Touring, 6 and 7	5,000	6	43.80	140	37x5	Left
Stearns-Knight, Six	Limousine, 7	6,100	6	43.80	140	37x5	Left
Stearns-Knight, Six	Landaulet, 7	6,200	6	43.80	140	37x5	Left
Stevens-Duryea, C-6	Roadster, 2	4,500	6	44.66	131	37x4½	Right
Stevens-Duryea, C-6	Touring, 5	4,500	6	44.66	131	37x4½	Right
Stevens-Duryea, C-6	Couplet, 3	5,000	6	44.66	131	37z4½	Right
Stevens-Duryea, C-6	Limousine, 7	5,800	6	44.66	131	37x4½	Right
Stevens-Duryea, C-6	Landau-Pha., 5	5,200	6	44.66	131	37x4½	Right
Stevens-Duryea, C-6	Semi-Berline, 7	5,750	6	44.66	131	37x4½	Right
Stevens-Duryea, C-6	Touring, 7	4,800	6	44.66	138	37x5	Right
Stevens-Duryea, C-6	Limousine, 7	6,000	6	44.66	138	37x5	Right
Stevens-Duryea, C-6	Berline, 7	6,200	6	44.66	138	37x5	Right
Stevens-Duryea, C-6	Landau-Pha., 7	5,400	6	44.66	138	37x5	Right
Touraine, 12	Runabout, 2	3,150	6	38.40	134	34x4½	Left
Touraine, 12	Touring, 7	3,250	6	38.40	134	34x4½	Left
Touraine, 12	Touring, 5	3,150	6	38.40	134	34x4½	Left
Vaughan	Inside drive, 4 & 6	3,800	6	33.75	138	38x4½	Left
White, G. A. F	Coupe, 3	3,250	4	22.50	110	34x4	Left
White, G. A. F	Roadster, 2	3,300	4	28.90	120	36x4½	Left
White, G. E. B	Touring, 5	3,300	4	28.90	120	36x4½	Left
White, G. E. B	Touring, 7	3,500	4	28.90	120	36x4½	Left
White, G. E. B	Coupe, 3	4,100	4	28.90	120	36x4½	Left
White, G. E. B	Limousine, 7	5,000	4	28.90	120	36x4½	Left
White, G. F	Roadster, 3	4,800	6	43.80	132	37x5	Left
White, G. F	Touring, 5 and 7	5,000	6	43.80	132	37x5	Left
White, G. F	Coupe, 3	5,400	6	43.80	132	37x5	Left
White, G. F	Limousine, 7	6,300	6	43.80	132	37x5	Left
Winton, 20	Runabout, 2 and 3	3,250	6	48.60	130	36x4½	Left
Winton, 20	Touring, 4 and 5	3,250	6	48.60	130	36x4½	Left
Winton, 20	Touring, 6 and 7	3,500	6	48.60	130	36x4½	Left
Winton, 20	Coupe, 2, 3 and 4	4,350	6	48.60	130	36x4½	Left
Winton, 20	Limousine, 7	4,350	6	48.60	130	36x4½	Left
Winton, 20	Limousine, 7	4,600	6	48.60	130	36x4½	Left
Winton, 20	Landaulet, 7	4,600	6	48.60	130	36x4½	Left

*Rear tires only; front tires are a size smaller

The New Cars

TO give the reader a concise idea of each of the car manufacturers' products for the new season Motor Age follows its annual custom by giving in the following pages a short description of each car on the 1914 market, pointing out in particular what changes have been made by the different makers during the past year. A study of these descriptions and of the illustrations of the cars on other pages, will show marked improvement in numerous features which make for greater reliability of the new vehicle, better lines and greater comfort for the motorist. It will be noticed that the bodies themselves are considerably lower than they have been in the past, in fact, there is a well defined tendency toward an increase in stability and toward compactness, both of which features are contributed to by the increased adoption of underslung springs at the rear and at the front as well in some cases. The appearance of solidity has been increased by the shifting of fuel tanks to the rear which serves to fill the space between the rear of the body and the axle. Similarly, the removal of the tank from under the seat to either the cowl or the rear axle permits the seats to be lower.

ALLEN

Newcomer appears with one chassis

THE four-cylinder Allen 40, made by the Allen Motor Car Co., Fosforia, O., one of the many new cars of 1914, is built on one chassis, with a wheelbase of 118 inches, to which is fitted either of two types of bodies, five-passenger touring or roadster, each selling for $1,395.

One feature that individualizes the Allen is the gasoline tank in the shroud dash, a gauge on the instrument board showing the quantity of fuel in the tank. Electric starting and lighting systems have been installed, and left drive and center control adopted as most feasible.

The cylinders of the unit power plant have a bore of 4.125 and a stroke of 5, giving an S. A. E. rating of 27.25 horsepower. The cylinders are cast in block. Timing gears are of the helical type and run in oil. The cooling system is thermosyphon, with a honeycomb radiator.

The motor is lubricated by a constant level splash system, the oil reservoir being in the lower half of the crankcase. A plunger pump, operated by an eccentric on the camshaft, furnishes oil to the timing gears and connecting rod troughs for splash to the pistons and crankshaft bearings.

Ignition, lighting and starting are separate systems and independent of one another. The lighting and starting is by Auto-Lite system, which consists of an engine-speed generator, storage battery and electric motor. Ignition is furnished by the Splitdorf dual magneto.

The clutch is a multiple-disk, the driving disks are faced with Raybestos and the driven disks are of steel with ground faces. It can be run dry or in oil in delivering the drive to the three-speed gearset.

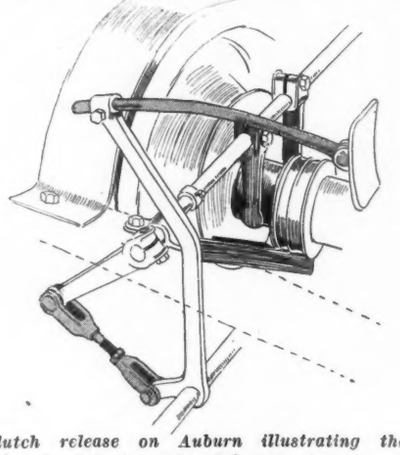
The Allen is upholstered with 10-inch cushions, the body nickel-trimmed throughout and the battery and lighting switches and all dash equipment made accessible to the driver by the arrangement of instrument board and cowl. The regular equipment includes Stewart speedometer, one-piece windshield, electric horn and extra demountable rims for 34 by 4 oversize tires.

ABBOTT-DETROIT

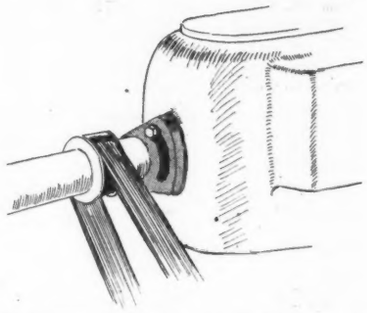
Belle Isle six-cylinder an addition

IN addition to continuing its two four-cylinder models, namely, the 34-40 and 44-50 types, with practically no changes mechanically, the Abbott Motor Co., Detroit, has a six-cylinder chassis. This light six, Belle Isle model, is provided with a 3.75 by 5.25 Continental motor. It is equipped with Auto-Lite electric cranking and lighting, and Bosch magneto. The latter is a single system, independent of the other electric apparatus. The L-head motor is a unit with the gearbox. The suspension is at three points by the overhead method, one at the forward end and two at the rear. The lubrication is by Continental's latest oiling system, a circulating splash arrangement with a new type of pump.

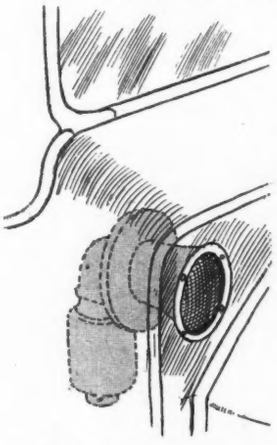
The touring body is a seven-passenger with a wheelbase of 130 inches and a net weight of 3,620 pounds. The tool boxes are concealed back of the dust shield, giv-



Clutch release on Auburn illustrating the clutch brake and pedal arrangement

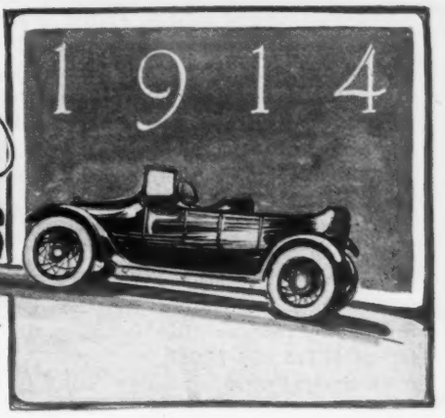


Auburn fan adjustment fan pulley is mounted on engine casting on a slotted base eccentric with the pulley



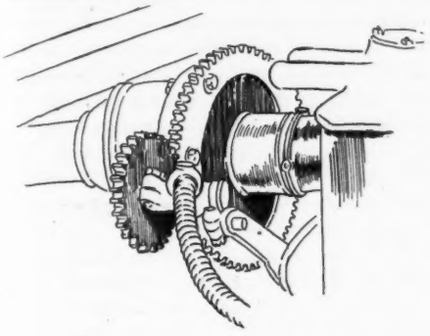
Abbott - Detroit's concealed horn. This is mounted under the cowl, the bell being flush with the dash and screen

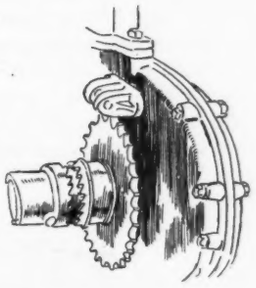
1914 in Detail



ing a clean running board. The car has left drive and center control.

Other features are a multiple dry disk clutch, the diameter of the plates of which has been increased over that of the fours, drive shaft provided with a universal joint at either end, floating rear axle mounted on Schafer annular and Timken





Speedometer drive on Apperson. The speedometer gear is mounted on the universal housing at the forward end of the propeller shaft

roller bearings, four-speed gear-set with direct drive on third and fourth, geared up 25 per cent. Unlike the fours, the new six has its springs mounted above the axles instead of being underslung. The 20-gallon gas tank is carried at the rear. Wheels have 35 by 4½ inch tires. The specifications list full equipment.

On the new six chassis, a roadster body is also fitted, equipped with wire wheels as standard.

The fours are continued in the various body models. The 34-40 has a 4.125 by 5.25 motor and a wheelbase of 116 inches, and the 44-50 is equipped with a 4.5 by 5.5 power plant and its wheelbase measures 121 inches. On these fours, the cowl form of dash has replaced the straight type, while heavier rear springs have been necessitated to carry the extra spare rim which is mounted at the rear. Steering and control are on the right, while multiple-disk clutch and three-speed gearset are in unit with the engine.

AMERICAN

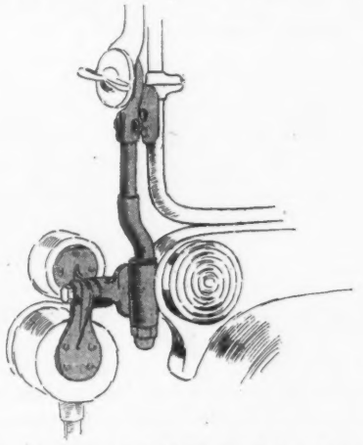
Underslung type with four chassis

THREE sixes and a four make up the American line, turned out by the American Motor Co., Indianapolis, the four-cylinder being the only model which is carried over from last year. On these four chassis five distinct models will be put out. These models are designated by number which includes the number of cylinders, the horsepower and the seating capacity. The 442 is a four-cylinder car, rated at 40 horsepower, seating two people and is the same car as has previously been known as the Scout. Beside this there are models 642, 644, 646 and 666, the latter a six-cylinder car of 60 horsepower, seating six persons and is known as the big six.

The power plant of the four, as well as the chassis, remains practically unchanged. The American Tourist model which has been displaced by the 646 and 644 will no longer be made. The only changes in the four-cylinder model are in the matter of equipment. An air-cranking system has been added and an electric-lighting generator. Air pressure is provided by a reciprocating pump.

The two new sixes are the same in general design; they have T-head cylinder, cast in a single block but with separate exhaust ports for each cylinder. The exhaust ports are at an angle with the manifold and point backward at an angle of about 40 degrees. Splash lubrication is used for the cylinders, the remaining bearings being lubricated by splash.

Electric lighting and cranking is provided for by a base which is cast integrally with the crankcase. A new double-type Disco, a two-unit instrument, in a single housing is used. The generator is driven from the pumpshaft through a flexible coupling. The double upper water



Combination windshield, bracket and speedometer bracket on Americans. The speedometer dials may be swung at any angle by loosening the stud

connection between the cylinders and radiator, a feature of American construction is continued.

Gasoline is fed by pressure through a hot-water jacketed Rayfield carbureter. Air pressure is maintained by a piston pump operated by cam on the rear end of the camshaft. Ignition current is furnished by an Eisemann dual magneto. An inverted cone clutch is used and a four-speed gearbox. The rear axle is floating. The regular equipment includes Ames-shock absorbers for the front springs and Truffault-Hartfords for the rear. Right-side control and steering are retained.

ARBENZ

Four-cylinder chassis; two bodies

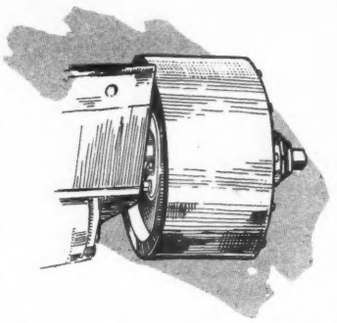
A FOUR-CYLINDER chassis upon which a five-passenger touring, four-passenger torpedo and two-passenger roadster are mounted makes up the line of the Arbenz Car Co., Chillicothe, O. The power plant is a 4.125 by 5.5 with L-head cylinders cast in pairs. The valves are all located on the left side and are operated by a helical gear driven camshaft. The transverse shaft carries the magneto and water pump. The crankshaft is carried on three main bearings bushed with bronze. A dual system of ignition is used and electric lighting and starting. A 15-gallon gasoline tank located under the front seat supplies fuel by gravity to a Schebler model L carbureter. The drive is taken by a leather-face cone clutch housed in the flywheel through a three-speed selective gearset carried in a unit with the rear axle to a bevel gear floating rear axle. The wheelbase is 120 inches. The tires are 36 by 4 all around and are fitted with demountable rims. The car is sold fully equipped.

AMES

One single chassis, a four-cylinder

AMES cars, made by the Ames Motor Car Co., Owensboro, Ky., are continued unchanged in the shape of a single chassis model known as the 45. This has a four-cylinder motor of 4⅛ by 5¼ inches bore and stroke, rating at 27.25 horepower by the S. A. E. formula, the motor is a block casting of the L-head type with a combination splash and pressure lubrication maintained by a piston pump. A Gray &

Davis starting and lighting system is supplied. In unit with the motor are the disk clutch and the three speed gearset. A conventional shaft and bevel gear reduction transmits the power to the floating rear axle. The wheelbase is 128 inches and tires 36 by 4 inches. The driver's position is on the left side and the control levers are in the center. Upon a single chassis are fitted two bodies, a five-passenger touring car and a roadster listing at $1,785 and $1,745, respectively.



Austin's flywheel. This is of comparatively small diameter, but very wide face so that the flywheel rim is protected by a mud pan and axle

APPERSON

Six-cylinder now part of the line

APPERSON cars make their formal entry into the six-cylinder ranks this year. Although a few sixes have been produced before this on special orders they never have incorporated as a part of the regular production program of the Apperson Bros. Automobile Co., Kokomo, Ind., six different chassis models are offered, four of which are six-cylinder cars. The four-cylinder car is the 4-45 which is continued practically unchanged from last year, of which it was the smaller of the two four-cylinder motors marketed.

Simultaneously with the entry into the six-cylinder field Apperson cars appear for the first time with left drive and center control. Also the three-quarter floating axle has been supplanted by the floating type throughout the range of models. The four-cylinder car aside from these changes has been altered only by the lengthening of the wheelbase, 2 inches in the case of the roadster model and 6 inches in the case of the touring car model so that these are 116 and 120 inches respectively.

The four six-cylinder models mark the transition of the Apperson products from the separate T-head cylinders to the block-cast L-head cylinders. There are two motor sizes, one known as the 6-45 with 3¾ by 5½-inch cylinders and the other 6-55 with 4¼ by 5-inch cylinders. Each of these has 120-inch wheelbase on the roadster chassis and 128-inch wheelbase on the touring chassis. Tires are 36 by 4 on the smaller size and 37 by 4½ on the larger six. The four-cylinder car has 24 by 4-inch tires as a roadster and 36 by 4 as a tourist. The four-cylinder car in addition to the standard roadster touring body which remain at $1,600 and $1,785 respectively carry coupe and sedan bodies as well. The lighter six is offered at $2,200 and the larger six at $2,350.

AUBURN

Four and six-cylinder on two chassis

TWO chassis models which are new this season make up the line of the Auburn Automobile Co., Auburn, Ind. One of these is a four and the other a six. The six is furnished with left or right drive. The six-cylinder power plant is a 3.75 by 5.25 having L-head cylinders cast in pairs. The valves are carried on the left side and are operated from a gear-driven camshaft carried on four plain bearings.

The motor is lubricated by a constant level combination force feed and splash system by which the oil is circulated by a piston pump. Water circulation is by a centrifugal pump through a vertical tube radiator cooled by a fan. Ignition is Simms dual high-tension. The gasoline system consists of a gravity feed gasoline tank which supplies the fuel to a model L Rayfield carbureter fitted with a hot air pipe. Starting and lighting is by the Remy electric system. A leather-face cone clutch delivers the drive to a three-speed gearbox and a floating rear axle of the bevel gear type. Drive is taken through radius rods. The wheelbase of this chassis is 130 inches and the tires 37 by 4.5 all around. On this chassis are mounted a five and six-passenger touring car and a two-passenger roadster.

The four-cylinder chassis differs materially from the six in general design. The 4.5 by 5 T-head motor is used carrying the intake valves on the right and the exhaust valves on the left. The camshaft is driven through helical gears. The gasoline system in this car is a pressure feed with the gasoline tank located under the front seat. The carbureter is a Schebler. The ignition system also differs from the six, being a Remy dual using a Remy high-tension magneto with dry cells for starting. The Remy starting and lighting system is used on this car. Another difference in the four is that it has left drive and center control whereas the six has right drive and right control on the 6-45 and left drive and center control on the 6-46. A cone clutch is also used in this car but the friction surface instead of being leather is raybestos. A full line of body types including five and six-passenger touring, two-passenger roadster and three or four-passenger coupé is offered with this model.

AUSTIN

New edition of model 55 out

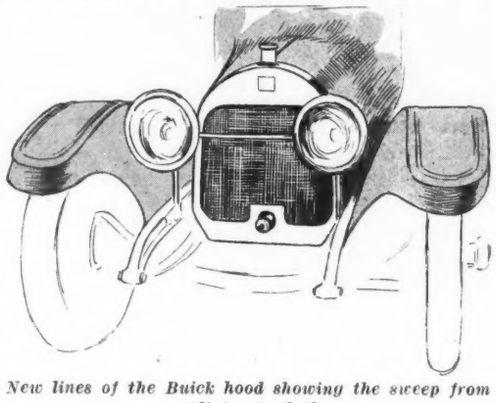
THE Austin Automobile Co., Grand Rapids, Mich., has brought out a new edition of its model 55, six-cylinder car which, though the same in general appearance and many of its chassis details as its predecessor, has a new motor, includes Remy electric lighting and cranking as regular equipment and incorporates the Austin two-speed axle as a standard feature.

The new power plant of the 66, the new model, is of the T-head type with the cylinders cast in blocks of three. The bore is 4½ inches and the stroke 6 inches, giving a stroke bore ratio of 1.333. This engine replaces an L-head type which had its cylinders cast separate, and though of the same bore as that now used, the stroke was ½ inch less, giving a ratio of 1.222. Thus though rated the same according to the S. A. E. formula, the new engine has a shade the advantage of the old in power.

The clutch, gearset and flywheel are housed in unit with the motor, the whole being suspended at three points.

Left drive and center control are featured, and though the spark and throttle levers and the gearshift lever are conventional, the brake control is not. The service brake is connected with the clutch pedal, coming into play after the clutch has released. The other pedal operates the emergency brakes, instead of having a lever alongside of the gearshift lever for this purpose. This lever's place is taken by the lever which shifts forward or back to operate the two-speed axle.

This two-speed construction affords two separate gear ratios on direct drive. The regular ratio is 4 to 1, while the special direct gives 2.5 to 1. Shifting from one to the other is done at will without interfering in any way with the gearing in the gearbox. Thus six forward and two reverse speeds are really afforded with this axle in combination with the three-speed gearset. The special advantage of this axle is that for hills and crowded city traffic the car is especially flexible of control by the use of the 4 to 1 ratio, without the bother of continual gearshifting, while for normal driving it is instantly possible to gear up to 2⅛ to 1, which means a material slowing down of the engine for a given car speed. This makes for less vibration, reduces noise to the minimum and is a factor for fuel economy.



New lines of the Buick hood showing the sweep from radiator to dash

The easy riding of the Austin has been further augmented on the new models by the use of a specially designed type of hydraulic shock absorbers. These are a patented Austin feature. The rear springs are underslung from the rear axle. The wheelbase of the car is 141¼ inches, and tires are 37 by 5 all around.

Besides this model, Austins are made

in two other models, which are built with substantially the same chassis and bodies, though the motors are of higher power. Model 66 has a 4.5 by 5.5 engine, while model 77 is fitted with a 4½ by 7 design. These are both sixes and much alike in general design, though differing from the model 55 engine. Their cylinders are cast separately, have T-heads, exposed flywheels and give approximately the horsepower which their model designations indicate. The price has been reduced from $5,000 to $4,000.

BUICK

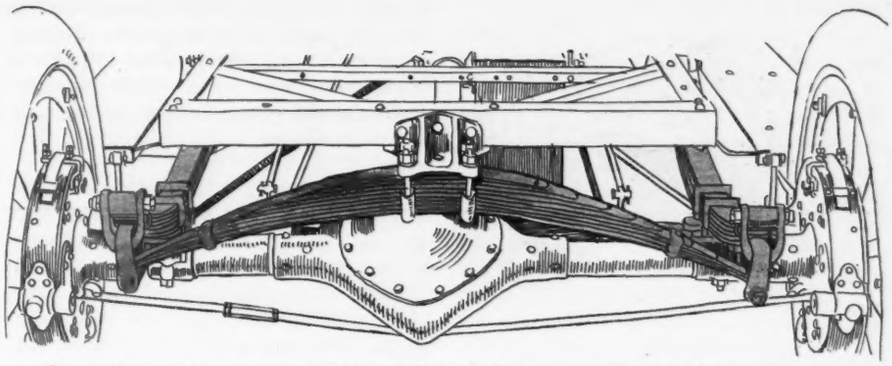
Introduces its first six-cylinder model

CARS on three chassis models are made by the Buick Motor Co., Flint, Mich. These consist of a small four, designated model B24 with roadster body and as B25 with touring body; a larger four known as B36 in roadster dress, B37 as a touring car and B38 as a coupé; and a six called model B55 in touring car type only. This is the first year Buick has offered a six-cylinder machine, and together with the larger four, comprises a line which is a new series in Buick making. They incorporate the latest of body fashion as to streamline appearance, sloping hood and rounded top radiator, and have clean sides and running boards. The four-cylinder cars are practically a continuation of the smaller chassis models of last year, refined and improved throughout.

All models use the valve-in-the-head motor. The same design evidenced throughout, the only differences mechanically being in the size of the parts, although the engine of the smaller four departs from the others in design to the extent that its gearset is separate from the engine, whereas with the larger four and the six they are all bolted together. The square 4 by 4 engine used in last season's four-cylinder has been dropped and in its place a 3.75 by 5 engine is used in the big four. The six-cylinder engine also has these cylinder dimensions, whereas the smaller four retains its 3.75 by 3.75 sizes.

Cylinders are cast in pairs and have integral heads. Both intake and exhaust valves open directly into the tops of the cylinders and the long valve rods are all on the right. One of the two mechanical changes of any note in the power plant is the use of new type of rocker arms and camshaft rods which now have ball joints working in oil-soaked, felt-lined sockets. This makes the valve mechanism noiseless, since metal works against felt. The exhaust manifold, instead of passing along the cylinders below the intake manifold, runs above, making the carbureter more accessible.

Electric cranking, lighting and ignition are incorporated in a combination Delco unit on all models as standard equipment, while left drive and center control replace right drive and control throughout the line. Instead of employing a subreservoir in the bottom of the crankcase as heretofore, the engines are now lubricated by a constant-level splash system, the lubricant being circulated by a gear-driven pump.



The platform spring rear suspension of the new Case cars. This arrangement gives a very great effective spring length.

The Buicks have cone clutches and three-speed gearsets. The propeller shafts are inclosed within torsion tubes and in this construction only one universal joint is fitted, this being at the front end. The axles of the fours are now of the three-quarter floating type. The six has a floating axle.

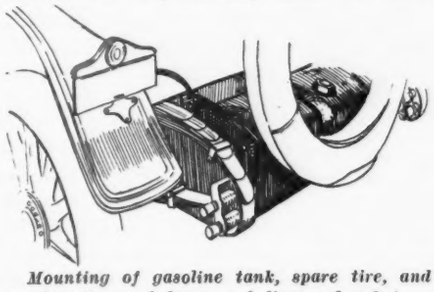
The gasoline tank on the larger four and on the six is placed at the rear of the chassis and the fuel is fed to the carbureter by pressure. The small four retains its fuel tank under the front seat, feeding by gravity.

The wheelbase of the small four-cylinder model remains at 105 inches, while that of the larger four-cylinder car is 112 inches, or 4 inches longer than that of the four-cylinder machine of last year which it replaces. For the six, 130 inches is used. The price of this new six is $1,985, fully equipped; of the larger four, $1,335 and of the smaller four, $1,050. These are touring car prices, the roadsters which are furnished on either of the four-cylinder chassis listing at $100 less in each case. The coupé is sold for $1,800.

CADILLAC

Two-speed rear axle talking point

THE policy of building a single chassis model with a four-cylinder power plant is still adhered to by the Cadillac Motor Car Co., Detroit, Mich. A most important change in the new model is the adoption of a two-speed, direct-drive rear axle to replace the conventional single type. Instead of having one bevel driving pinion connected with the propeller shaft, and a single bevel-driven gear, as in the ordinary construction, the Cadillac now is fitted with two bevel pinions and two bevel gears thrown into mesh by electro-magnets. This affords two different gear ratios, each driving direct from the engine to the axle without intermediate gearing when in high. The low gearing gives a ratio of 3.66 to 1 and the high 2.5 to 1.



Mounting of gasoline tank, spare tire, and combination tail lamp and license bracket on the Chandler

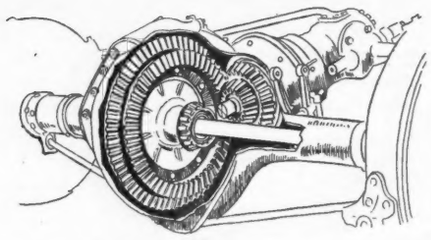
This new axle feature does not affect the other gearing in any way, that is, with either set of axle gears operating, the shifting of gears from first to second to third or to reverse in the gearbox is the same as though the ordinary axle were used. Thus this two-speed axle makes possible six different speeds forward and two reverse.

The new Cadillac also has special provision for easy access to the driver's seat from the drive side of the car. This is made possible through the hinging of one of the arms of the steering wheel so that the wheel will drop into a vertical position. The arm opposite is made in U-shape to go around the steering column, while there are two latches at the top of the column which engage notches near the center of the spider and hold the wheel rigidly in normal position for driving. Besides making the doors wider, the entrance from the drive side is further facilitated by the hinging of the driver's seat so that it will swing up out of the way.

The combination Delco cranking, lighting and ignition system is retained on the 1914 cars, though several detail refinements have been made. A double system ignition employing two sets of spark-plugs has been replaced by a dual system using one set of plugs. This simplifies the wiring to a large extent. The electric heating for easy starting is applied to the carbureter.

This year the gasoline tank is placed at the rear of the chassis and below the frame, the fuel being fed to the carbureter by pressure. This replaces the gravity feed method with the tank under the seat as formerly used. The tank holds 20 gallons.

The well-known Cadillac motor has singly-cast, L-head, removable cylinders. These heads carry the valve chambers and pockets. The cylinders are 4.5 inches in diameter and the stroke is 5.76 inches,



Interior of Cadillac's two-speed rear axle by which are given two different speeds with direct drive

giving a ratio of 1.28. The cylinders are copper water-jacketed—a characteristic Cadillac feature which long has been familiar to motorists.

The crankshaft is carried on five bearings, the camshaft on three. The motor suspension is by means of two arched cross members from the center of which the motor is hung, front and rear. An automatic splash system oils the motor most efficiently.

The cone clutch retains its special spring ring in the flywheel, making for easy engagement, while back of it is the three-speed gearbox. A special feature of the front axle is the concealment of the speedometer driving gears within the left wheel spindle. The wheelbase is retained at 120 inches.

Seven body styles are offered, these being a five-passenger touring car, seven-passenger touring car, four-passenger phaeton, roadster, landaulet, coupé for three, five- and seven-passenger limousines. Besides the usual equipment, the new Cadillacs have a power-driven tire pump and an electric horn under the hood, where they are most advantageously located.

CARTERCAR

Two models added by friction-drive concern

THOUGH not favoring the annual model idea, the Cartercar Co., Pontiac, Mich., has added to its line of open and closed cars fitted to model 5 chassis a roadster and touring car mounted on an entirely new chassis, known as model 7. This has been added to meet the demand for a cheaper car than the model 5. In it, the standard Cartercar type of friction drive is incorporated, but a number of modifications of the larger design have been included in order to make a less expensive and lighter job.

The new model 7 sells for $1,250 and is equipped with a 3.5 by 5-inch three-point suspended engine. The four cylinders are block cast and have a detachable head. The lubrication is by splash, water-cooling with a centrifugal pump is used and a dual ignition system which is a part of the electrical combination furnishing lighting and cranking as well, is employed. This electric apparatus is standard with the Cartercar.

The transmission is of the Cartercar patent friction type and the final drive is through a silent chain running in oil. The rear axle is three-quarter floating and the car has a wheelbase of 106 inches. Demountable rims carry 32 by 3½-inch tires. Roadster and touring bodies may be had on the model 7 chassis of the Cartercar.

The model 5 car, which sells for $1,700 as a touring car and $100 less as a roadster, is also fitted with a four-cylinder motor of the L-head type with valves on the left. The cylinders are in pairs, have a bore of 4⅛ inches, and the stroke is 4¾ inches. The motor also has three-point support. Splash lubrication and centrifugal pump water circulation are used, as is a low-tension magneto ignition system. Light and cranking by electricity are also featured.

Back of the engine there is the same type of friction and final drive as mentioned above. This car has its gasoline tank under the cowl, the fillers protruding conveniently through the cowl, also a visible gasoline gauge. The wheelbase of this model is 116 inches, as heretofore, and tires are retained at 36 by 4 inches all around.

Besides the open bodies, the model 5 is fitted with a distinctive design of coupé and also a sedan. The former is listed at $1,900 and the latter at $2,000. These are most attractive in design, being along the colonial lines. Right-hand steer is used on the Cartercars.

CASE

Equipment a strong 1914 feature

FOR 1914 the J. I. Case T. M. Co., Racine, Wis., has discontinued the model 30, is building two new fours, the 25 and 35, and will carry over but one 1913 model, the 40. The feature of the entire Case line is the equipment. This includes the Westinghouse two-unit cranking and lighting system, Warner Autometer, clock, electric horn, extra tire on a rim, two extra inner tubes, spark-plug pump on the 40. Weed tire chains, windshield, and work light. The new 25 is a 110-inch wheelbase car, selling at $1,250 in 1914.

The motor is of four cylinders of 3.75 bore and 4.75 stroke of T-head construction. A disk clutch, three-speed selective gearset and semi-floating rear axle are used. Bosch duplex ignition and a Rayfield carbureter are part of the motor equipment.

The model 35 is slightly larger in size, having a 120-inch wheelbase, but in general design it is the same. The motor is of four cylinders with a bore and stroke of 4.25 by 5.5. The motor uses Bosch dual ignition. The Case 40, which is carried over from 1913, has had the price increased from $2,250 to $2,300, Bosch dual ignition supplanted by two-point of the same make, and the air pump for the pressure, gasoline feed changed from the left to the right side. The 40 has a 124-inch wheelbase and 37 by 4½-inch tires. In general appearance and construction it is similar to the rest of the line offered by the company.

All Case cars are made with the instruments on a cowl board, which makes for ease of operation.

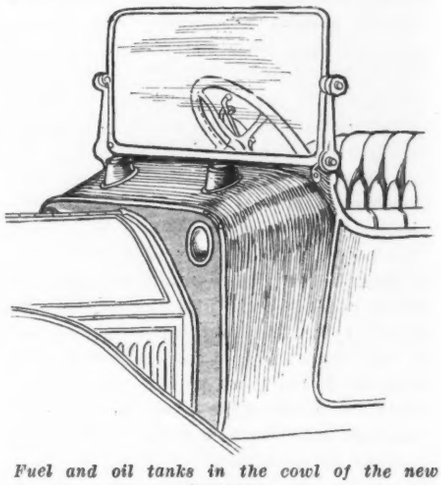
CAMERON

New water-cooled model brought out

CAMERON has a new car for this season which, besides water-cooling, embodies many features new to the policy of the Cameron Mfg. Co., West Haven, Conn. The chassis incorporates a four-cylinder block motor having a bore of 3.625 inches and a stroke of 5 inches. The valves are located in the centers of the combustion chambers and placed directly over the pistons, being operated by inclosed rocker arms from a single camshaft. The motor has a particularly compact appearance for a valve-in-the-head design, as it is fully inclosed with all its working parts running in oil, the aim being to secure the high power of the overhead valve action without its noise.

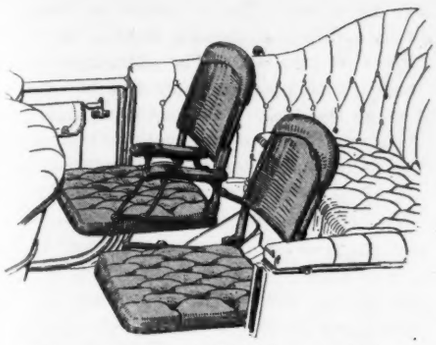
The ignition current is furnished by a high-tension magneto and the circulating oiling scheme is operated by a pump contained in the crankcase. A distinctive feature in the cooling system is the pointed radiator which tends to give the car a long racy appearance. The gasoline system is a gravity feed, the tank having a capacity of 18 gallons and being carried in the cowl on all except the raceabout model, in which it is mounted behind the rear seat. This is a speed car of low lines and wire wheels.

The clutch is an inverted cone transmitting power to a four-speed and reverse gearset furnishing direct drive on all



Fuel and oil tanks in the cowl of the new Cartercar

speeds. This gearset is a distinctive feature of Cameron design and is remarkable for the fact that in securing the four forward speeds and one reverse but eight gears and eight bearings are required in the complete gearbox and rear axle, which are mounted as a unit. This of course includes the differential. Elliptic springs with scroll ends are used in the rear and the wheels are 32 inches all around, equipped with 32 by 3.5-inch tires. Both brakes operate on the rear wheels, the



Auxiliary seats in the Cole tonneau which may be folded out of sight

emergency brake being controlled by a lever in the center of the car, as the steering is mounted on the left side. A dark blue finish is standard on the Cameron cars; the weight is 1,975 pounds, wheelbase 115 inches and the price $1,200, including lighting and starting by electricity.

CHADWICK

Chain-driven six is featured

A SIX-CYLINDER, chain-drive chassis with four types of body consisting of a roadster, touring tourabout and limousine compose the line of the Chadwick Engineering Works, Pottstown, Pa., for this season.

The car is equipped with a Westinghouse electric lighting and starting system and weighs about 3,000 pounds without the body. The motor has its cylinders cast in pairs, each pair being surrounded by a copper water-jacket. The shape of the cylinder casting is L-head and the intake valve is carried in the head and the exhaust valves are located on the left of the motor.

The two camshafts are driven by helical gears. The ignition system is divided into two independent parts, giving a two-double system. For running current the Bosch D R 6 magneto is used with hand control operating a spiral sleeve which rotates the armature shaft, giving a hot spark with the magneto while running at low speeds.

For starting current the battery is employed, or the car can be started on the magneto owing to the spiral sleeve control. The electric starter is the Westinghouse single-wire system, which is combined with the lighting equipment. The entire system is operated at 6 volts.

The power is taken from the motor by an expanding band type of clutch faced with leather, the leather friction surface bears against the cast-iron flywheel and takes the drive back to a four-speed gearbox mounted amidships. The control of the gearset is semi-selective with the shifting lever mounted on the right side of the driver's seat.

Power is transmitted by double chains, inclosed in grease-tight aluminum chain cases to the wheels, which run on dead rear axle. Fourth speed is direct and has a total reduction of 2.25 to 1. Third speed, which is semi-direct, has a 3 to 1 reduction. The drive is taken through radius rods. The wheelbase of the car is 112 inches for the roadster and 133 inches for the others and the tread 56.5 inches.

CHALMERS

New light six saved for show debut

CHALMERS has two representatives this year—the model 24 Six-60 and the model 26 Six-48. The latter selling at $1,800, makes its debut at the New York show. Though the Chalmers Motor Co., Detroit, had a six last year, the Six-60 is not a continuation of it. The new six has a T-head motor, which type of power plant is entirely new to Chalmers construction; a casting with the intake valve in the head being characteristic of Chalmers motors hertofore. Compared with last year's six, the new model 24 has a slightly smaller motor, a wheelbase 2 inches longer —132 inches—and lists at $2,175 in roadster and four and five-passenger touring designs, which is $225 under the figures on the six of last year in similar body types.

The cylinders of this new six are cast in threes with the exhaust valves on the right and the intakes on the left. With cylinder dimensions of 4 by 5.5 inches the motor has an S. A. E. rating of 38.4 horsepower. The six of last year had a bore of 4¼ and a stroke of 5¼ inches, hence it is seen that the new motor has a still stronger inclination to the long-stroke design, and this along with slightly less bore gives a very economical power producer. The gearset is in unit with the motor.

The crankshaft is mounted on three bearings, and a new feature is the use of tungsten steel valves which are said to be proof against pitting. The motor has a new oiling system of the force-feed type. The overflow from the crankshaft bearings instead of dropping to the sump is led out of the opposite end from which it enters through a short pipe and drops into trays integral with the side of crankcase and from these it flows into the connecting rod troughs, later finding its way to the sump.

The new Chalmers-Entz combined electric cranking and lighting system supersedes the air-starting system of the 1913 models; single Bosch ignition takes the place of the previous dual type. The combined motor-generator has a novel position, being located under the right front seat and driven by a short propeller shaft, extending forward to the flywheel.

Besides the improvements over the former six which have already been delineated, the model 24 is provided with cork inserts in one set of disks of the multiple-disk clutch; there is a new torsion rod design which makes use of a curved leaf steel spring at the front end instead of a spring buffer; rear springs are underslung; for the first time in a Chalmers model, left drive and center control are used; the gasoline tank has been placed at the rear for the first time on a Chalmers.

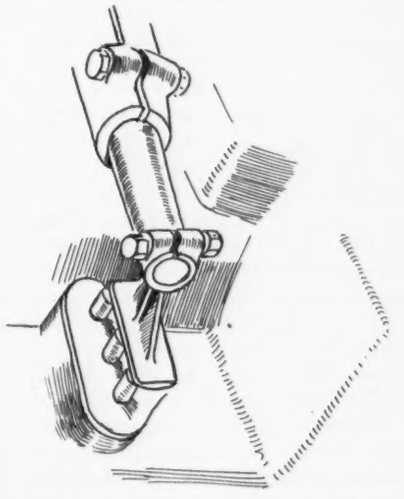
Six body style are made to be fitted to the model 24 chassis. These are streamline designs and in the open models the hood is heightened and widened as it converges into the cowl. No side lights are fitted. Besides full standard equipment, wire wheels and tire pump are optional extras. Tires are 36 by 4½ all around.

The Six-48 is designed to answer the demand for a lighter weight six-cylinder car. This latest of Chalmers sixes has, like its larger brother, a six-cylinder T-head motor, and marks an even stronger tendency than previous Chalmers sixes to the long-stroke design. The bore is 3.5 inches and the stroke 5.5 inches.

The wheelbase is 126 inches, and the chassis is equipped with 34 by 4-inch tires, instead of 36 by 4.5-inch as on the larger six. The clutch is the multiple-disk cork-insert type, like the big six and a three-speed transmission is used.

In every essential detail of construction the little six is similar to the big six-60. Lubrication is by the combination force-feed and splash system. The Chalmers-Entz electric starter, with generator and battery beneath the front seat, is used in the lighter model and Rayfield carbureter, with dash adjustment, is regular equipment. Atwater Kent ignition is also a departure.

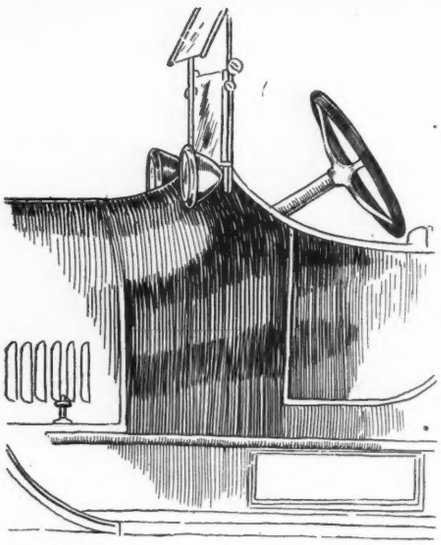
In the six-48 the fuel is carried in a tank beneath the cowl of the dash. As in the case of the larger Chalmers six,



Bracket for body support on Chalmers, eliminating squeaks, and interlocking device on gearset

the new six-48 has a streamline body. Doors are fitted without moldings and with invisible hinges. Tires are carried at the rear, giving clean running boards. Left drive and center control, permitting of entrance from either side, are also found on the new model.

In addition to the touring car, the six-48 is provided in a two-passenger coupelet. This is a combination inclosed and open car type. With top raised it has the appearance and affords the protection of a regular coupe body; for summer driving the top may be folded down and the door



Illustrating the sweeping curves of the Davis and the bullet-type side lights

glasses lowered, giving a strictly open roadster body.

The equipment is complete, including even a spare demountable rim and license brackets which is out of the usual.

CHANDLER

Lightweight six at a moderate price

CHANDLER cars were not exhibited at the last shows, for the reason that at that time the Chandler Motor Car Co. had just been organized and only had an experimental car on the road. Since then the company has established a factory at Cleveland, O., and at the present time is turning out 200 cars a month.

The makers anticipated the demand for a lightweight six at a moderate price and in consequence of their foresightedness they are offering one that weighs less than 3,000 pounds fully equipped, selling for $1,785 and with fuel economy one of its strong points. Such features as the Westinghouse two-unit system of starting and lighting, Bosch magneto, Firestone demountable rims, F. and S. imported annular ball bearings, and Jiffy curtains are found on the Chandler.

The company manufactures its own motor from its own design, it being of the L-head type with the cylinders cast in two blocks, the valves inclosed, and the camshaft and cams cut from solid forgings. The crankshaft bearings are 1⅞ inches in diameter, more than one-half of the diameter of the pistons themselves. Attention is called to the fact that the cast aluminum crank base extends to the frame sides, thus securing rigidity of engine mounting as well as protecting the motor from mud. This motor base also serves as an accessible mounting for the magneto, pump, electric horn, starting switch and other accessories. The three-speed gearset is inclosed in a unit case with a multiple-disk clutch, this unit being bolted directly to the engine base.

The oiling system is contained within the motor, with a rotary pump installed in the large oil reservoir of the engine pan, oil being pumped directly to all main bearings and all working parts. An individual trough system under each connecting rod provides splash lubrication for rods and pistons.

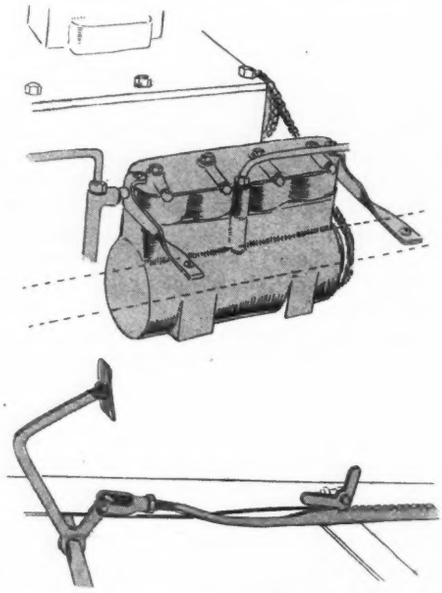
Other features of the Chandler are cooling by centrifugal pump, floating pressed steel rear axle, double-expanding type brakes, 34 by 4 wheels. In the way of bodies the Chandler follows the streamline idea with 10-inch Turkish upholstering, windshield built in without braces and adjustable for rain or ventilation. There are five styles of bodies, a five passenger that lists at $1,785, a roadster that lists at the same figures, the three-passenger coupe at $2,485, a five-passenger limousine at $2,985, and a five-passenger sedan at $2,885.

CHEVROLET

New light six-cylinder model added

A NEW light six-cylinder model to sell at $1,475 is something the Chevrolet Motor Co., Flint, Mich., kept up its sleeve until show time. This new six, which has just been announced, fills out a line that also includes two fours, the Baby Grand which sells at $875 and the Royal Mail roadster, which lists at $750.

The six is a touring car, the motor being of the L-type and with cylinders 3 5/16 by 5¼. The valves are inclosed and the gearset is placed on the rear axle. The car has a 112-inch wheelbase and carries 34 by 4-inch tires. Such equipment features as electric lights and a self-starter, mohair top, curtains and boot and clear-vision



Above, four-cylinder air compressor for cranking DeSoto; below, DeSoto's pedal operated emergency brake with its automatic latch

windshield are included. The self-starter, which the Chevrolet fits to the six-cylinder model is of the electric type. It is an Auto-Lite.

The four-cylinder motor used on the Baby Grand and the Royal Mail, is of the valve-in-the-head type and with cylinders 3 1/16 by 4-inch. The cylinders are cast in block and have detachable heads. Also the valves are inclosed. The oiling system is splash, with positive pump and the sight-feed on the dash. The ignition is high-tension, the clutch of the leather-faced cone type, the cooling thermo-syphon, while left drive and center control are other features.

On the Baby Grand, which is a touring car, the tires are 32 by 3½-inch, and there is a 16-gallon gasoline tank, which is carried in the rear. The wheelbase is 104 inches and the weight of the car, equipped and carrying gasoline, oil and water, is given at 2,200 pounds. Electric lights with generator and an electric starter are quoted as extras at an additional cost of $125. When this type of electric equipment is employed a coil and distributor are used in the ignition system instead of a magneto.

The main points of difference between the Baby Grand and the Royal Mail consist of smaller tires, 30 by 3½, on the latter a larger gasoline tank, one carrying 20 gallons, while the weight is reduced to 1,975 pounds.

COEY

Four-cylinder added to the line

A NEW four-cylinder car has been added to the line of the Coey-Mitchell Automobile Co., Chicago, which now consists of two cars, a four and a six, the latter appearing this year with no changes. The feature of the new four is the price, which is $995 in five passenger touring form. This car has a short-stroke motor of 5½ by 5¼ inches, with T-head cylinders cast in pairs. The motor is thermo-syphon cooled. Another feature of this car is the rear axle gearset unit, the drive to it being through a disk clutch and from it to a semi-floating rear axle. The wheelbase is 128 inches and the drive right and control center.

COLBY

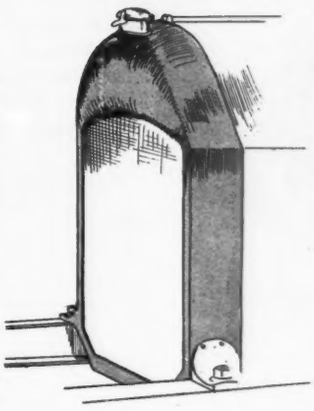
Six-cylinder company's trump card

THE Colby Motor Co., Mason City, Ia., is confining its efforts to a six-cylinder chassis known as 6-C-60. This is made either a seven-passenger or two-passenger roadster. The car has right drive and right control. The power plant is a unit supported at three points, including the motor, clutch and gearset. The 4.125 by 5.25 motor has its L-head cylinders cast in pairs with the manifolds as separate castings.

The valves are all on the left side and are operated by a camshaft driven through helical gears. The motor is lubricated by splash, the oil being circulated by a plunger pump and maintained at a constant level. Water is circulated through a honeycomb radiator by a gear pump. Double ignition system is used, the source of current being an Eisemann high-tension magneto. Fuel system includes a Rayfield carbureter which is fed by pressure from a 23-gallon tank located beneath the

chassis at the rear end. This tank has a reserve holding 7 gallons. Lighting and starting is by the Gray & Davis electric system working in co-operation with a Willard storage battery through the single-wire system at 6-volts.

The chassis running gear includes a disk clutch of which the friction surfaces are steel against raybestos delivering the drive to a three-speed selective gearset housed in the same casing that holds the clutch. Shaft drive transmits power to a bevel gear floating rear axle. The wheelbase is 136 inches, the tires 37 by 5 all around fitted with demountable rims. An extra demountable rim is supplied and shock absorbers are fitted as standard equipment.



Unique curved radiator on the new Detroiter

COLE

Three old models dropped; two added

THE 1913 three-chassis line of Cole cars made by the Cole Motor Car Co., Indianapolis, has been dropped for the 1914 season and two entirely new left-drive cars offered, a four and a six-cylinder model of streamline design. They have concealed hinges and inside door handles; the running boards are also clean, this being obtained by placing the tools under the front seat and the battery under the floor boards. The tires are carried in the rear of the chassis.

The four has a 120-inch wheelbase and the six a 136-inch wheelbase and the power plant, clutch and gearset arrangements the same in both models. The bore and stroke of both motors is 4.25 by 5.25 inches, the cylinders L-head cast in pairs, and have water-jacketed intake manifolds. A motor-driven air pump gives the required pressure for the fuel, which is fed to a Stromberg carbureter.

The Delco motor-generator and a battery comprise the dual ignition system. On the four-cylinder car the motor-generator is driven by helical gears, while on the six a silent chain is used. Splash pressure oiling is used and water circulation is by centrifugal pump. The Delco improved 6-volt cranking, lighting and ignition system has been adopted on Cole cars for 1914.

The drive from the motor is taken by a cone clutch operating on ball bearings. This clutch is equipped with a brake to prevent clutch spinning and thus make speed-changing noiseless and easy. In unit with the motor is the three-speed selective gearset, the feature of which is that the shifter shaft is serrated. A 4 to 1 motor-to-rear-axle ratio is used.

The drive shaft is equipped with two Spicer universals and operates a Timken floating rear axle. The instrument board which carries the lighting, cranking and ignition switches hand air pump for gaining initial tank pressure, sight feed clock, speedometer, etc., is located at the rear of the shroud so that the instruments are within easy reach of the driver.

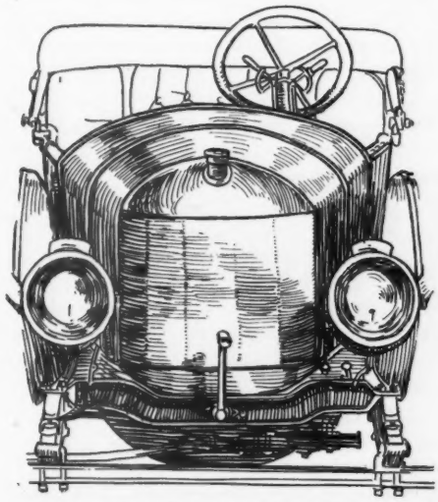
CONTINENTAL

New model added; old one continued

TWO four-cylinder chassis known as model 27 and 30 are the Continental output for this season, turned out by Martindale & Milliken, Franklin, Ind. Model 27 is a holdover from last year while 30 is new throughout. The new model is more in the long-stroke class than the previous Continental design, having a 3.5 by 5-inch power plant as compared with a 4.5 by 4.5 engine in the model 27. The new car is made in a five-passenger torpedo and a two-passenger torpedo roadster body. The L-head cylinders are cast in block and the intake manifold is a unit with the cylinders. The exhaust manifold is cast separately. A unit power plant is formed by having an extension of the crankcase include the clutch and gearset. The motor is cooled by thermo-syphon system and a vertical tube radiator. Ignition is by the same battery that is used in connection with the Westinghouse or Jesco electric lighting and starting system. The advance of the spark is controlled by a governor, thus giving a single automatic ignition. A dry disk clutch transmits the power to a three-speed selective gearset and a bevel gear floating rear axle.

Propulsion is taken through the lower section of the three-quarter elliptic rear springs. Left drive and center control is used on this car. It has a 110-inch wheelbase and 32 by 3.5 tires are fitted to the wheels.

The holdover model 27 is a little changed from last year, as far as general design is concerned, most of the changes being refinements. Right drive and center control is used.



Grant has D-shaped radiator and tapered body

CORBITT

Southern concern makes few changes

CORBITT cars are changed but slightly from last year's construction, the only alterations being the ignition outfit, the steering gear, the torque construction and the bracing of the motor. In the new cars the magneto has been abandoned and the Atwater Kent type K distributor and coil substituted. These are built for automatic spark advance and are provided with connections for two sets of batteries. The steering arrangement is of the worm and gear type with friction control throttle levers above the wheel and the wheel has a corrugated rim with the arms of the spider inserted.

This construction differs from that of last year in that the throttle levers did not have any quadrant at all, a ratchet device in the steering head keeping the levers from changing their positions. A double jet instead of a single jet carbureter now is employed. The new torque construction has a ball and socket cushion on the front end while the earlier type was fastened rigidly to the cross member of the frame. An additional brace at the rear end of the motor has been provided which still allows free action of the three-point suspension but at the same time holds the motor rigidly and prevents it from vibrating under load.

The product of the Corbitt Automobile Co., Henderson, N. C., still appears as a four-cylinder 4 by 4½-inch motor of the L-head type cast in pairs. Helical timing gears pump water circulation and a combination splash-pressure oiling maintained by gear, pump is retained. The North East electric lighting and cranking system is fitted as stock, the disk clutch and three-speed gearset forming a unit power plant which is suspended at three points. The axle is of the floating type. The wheelbase is 120 inches and tires 34 by 4 inches in size. Right drive with center control is supplied.

Three bodies are offered, a five-passenger touring car at $1,650, a four-passenger touring car each at $1,600 and a roadster at $1,400. This marks a reduction of $325 in the case of the five-passenger car, $375 on the four-passenger and $400 on the roadster.

CORREJA

Six-cylinder with a block motor

THE Correja car for this year made by Vandewater & Co., Elizabeth, N. J., will be a six-cylinder, 50-horsepower, with the cylinders cast in block. The motor is a 3.75 by 5.5 and has the valves all on the right side. They are operated from a camshaft driven by helical gears. An external longitudinal shaft running along the left side of the motor operates the water pump and magneto.

The motor is cooled by water pumped through the jackets and through a honeycomb radiator by centrifugal pump. The Zenith carbureter is used in connection with a pressure feed gasoline system, the fuel being fed under 2.5 pounds of air from a tank of 18 gallons capacity, located under the rear end of the chassis.

The electric equipment of the car consists of a Ward-Leonard electric lighting and starting system, in connection with a Willard storage battery and a Simms high-tension S U 6 magneto, fitted with hand control. The magneto furnishes the sole source of ignition current.

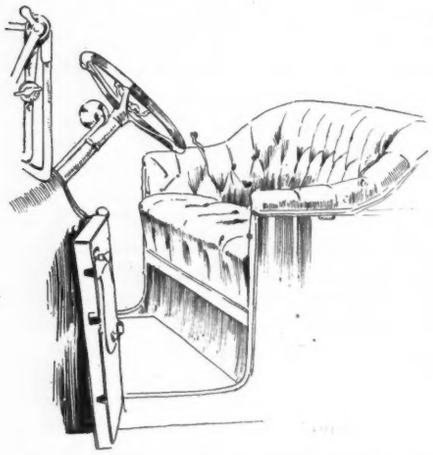
The clutch is a leather-faced cone contained in the flywheel and the gearset is a selective sliding one mounted as a unit with the rear axle. The gearset provides three speeds, and has a ratio of 3.5 to 1 on high, which is direct. The rear axle has a bevel drive, and the shaft is inclosed in a torsion tube. The wheelbase of this car is 128 inches and the tread 56 inches. Thirty-four by 4-inch tires are used. The springs are all overslung. The chassis weight, with gasoline, water and oil, is 2,800 pounds.

CRANE

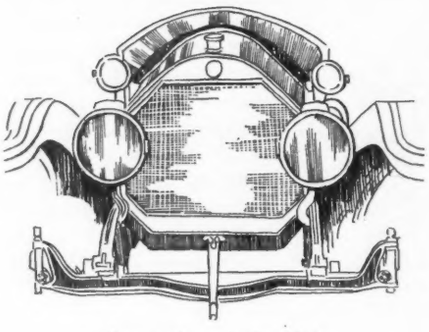
New six in high-priced class

SELLING for $8,300 without a body, the Crane chassis, made by the Crane Motor Car Co., Bayonne, N. J., is in a price class by itself. The six-cylinder power plant has its 4.375 by 6.25 cylinders cast in threes. They are L-head and have their valves on the left side. The valves are operated by silent chain-driven crankshaft. The crankshaft is carried on three bearings, one at each end of the crankcase and the other between the two blocks of three cylinders. These bearings are of the plain type.

The camshaft is also carried on three plain bearings. The electric equipment includes a Rushmore starting and lighting system and Bosch dual ignition. The entire electric system operates at 6 volts and is a single-wire type. The motor is lubricated by force feed, the oil being delivered under pressure to the main bearings and connecting rods. The motor is



Forward compartment of Empire, showing carburcter adjustment on steering column



Front view of the Glide

cooled by a centrifugal pump and a honeycomb radiator. The clutch is a single disk in oil having a multibestos face against steel. It is housed within the flywheel in an extension of the crankcase which also includes the gearbox. The gearset provides four speeds forward and delivers the drive to a floating rear axle from which the drive is taken through the rear spring. The emergency brakes are on the rear wheels and the surface brake on the transmission just back of the gearset. The wheelbase is 136.5 inches, the tread 56.5 and the tires 36 to 4.5 and 37 by 5 rear.

The Crane company's practice of making and selling only the chassis is a European trend which is unusual in this country.

CROW-ELKHART

Three chassis and ten body styles

THREE chassis and ten body styles are carried by the Crow Motor Car Co., Elkhart, Ind., the line consisting of two fours and a six. There have been a few changes made in mechanical construction, the 1914 cars coming through with heavier frames and in the case of the 40-horsepower car, cylinders are now cast in pairs instead of in block, and in the six-cylinder in block instead of in pairs.

Flush lights instead of the bullet have been adopted, oversized tires are used and the windshield is mounted on the cowl. The small four has a bore and stroke of 4 by 5 inches, the cylinders are L-head, cast in pairs, and thermo-syphon cooled. A feature of Crow-Elkhart construction this year is the rear axle gearset. The little four has a semi-floating rear axle, 114-inch wheelbase and 33 by 4-inch tires. Two body styles are offered, a roadster known as the D 42 and a five-passenger touring known as the D 45. The larger four-cylinder car differs only slightly from the one previously mentioned, the bore and stroke being 4¼ by 5½ and the cylinders cast in block. The only other differences are in the rear axle which is three-quarter floating, the wheelbase which is 120 inches and the tire size, 34 by 4.

This car is equipped with four body styles, a roadster and three touring cars, the former seating two, and the touring cars seating four, five and six. The new six is identical in construction with the larger four with the exception of the rear axle which in this case is floating. The wheelbase is 130 inches and the tire size 36 by 4. This car also appears with four body styles, as the large four.

CROXTON

Four-passenger four-cylinder model

THE Croxton Motor Car Co., Washington, Pa., is making a left drive and center control chassis fitted with a four-cylinder power plant and a four-passenger body. The motor is a 4.125 by 5.5 with its L-head cylinders cast in a block. The camshaft is driven through helical gears and is carried on three plain bearings. The motor is cooled by thermo-syphon system, vertical tube radiator and a fan formed by the pitched blades of the flywheel. A Mea high-tension dual ignition is used and the carbureter is a Planhard fed by gravity from the tank of 22-gallon capacity located under the cowl. Electric lighting is supplied by the North East working at 6 volts. The clutch is a raybestos and steel disk design, housed amidships with the gearbox, furnishing through the gearset three-speeds forward. The rear axle is floating, the wheelbase 121 inches and the tread 56. The car is sold with full equipment and either wood or wire wheels are provided, the front wheels being carried on roller bearings.

CUNNINGHAM

Model M the successor to model J

MODEL M is the successor to model J in the series turned out by James Cunningham, Son & Co., Rochester, N. Y., but there have been only few changes in the newcomer. Instead of right drive, as in J, model M drives from the left and also has a single unit starting and lighting system. Center control is used and both axles have been strengthened. The roller bearing knuckle head is used in place of the plain bearing.

In all other respects M is the same as J. The cylinder sizes on the four-cylinder motor are the same as before, 4¾ by 5¾, and the motor again is of the valve-in-the-head type. As showing how the company could peer into the future, it might be stated that model J, brought out a year ago, had the fuel tank in the rear, using pressure feed, while the spare tires also are carried in the rear. These same features are retained in model M.

Body lines in the Cunningham are as usual abreast of the times, the offerings consisting of a runabout, touring car, limousine, landaulet and berline, the last three being of seven-passenger capacity.

EMPIRE

Enlarged and refined edition of model 31

ALTHOUGH still known as model 31, this year's Empire is a much enlarged and refined edition of the model 31 Empire, made by the Empire Automobile Co., Indianapolis, brought out last season. These refinements are almost entirely in the nature of comforts for the driver by

increasing the equipment, improving the upholstery and giving a more elaborate body design. All these features are included while the price is cut $50. The biggest change in the chassis is the wheelbase which is now 6 inches longer. Last year it was 104 inches and it is now 110 inches. Some of the distinguishing features of this car are its unit power plant, three-point suspension, accessibility of the valve, clutch and gearset action and the use of only one universal joint in the drive system. The car has right drive and the emergency lever and gearshift are located in the center. The ignition system is a little different from the ordinary as an Eiseman magneto with fixed spark is used, thus eliminating the hand spark control from the steering column which now has only one lever which controls the throttle. The standard body furnished with the Empire model 31 is a five-passenger touring. It is constructed along modern lines, having a cowl dash, straight-line body with Turkish upholstery and upholstered door ledges.

ENGER

Model G has new body and fenders

WHEREAS the Enger Motor Car Co., of Cincinnati, O., called its models F, J, E, and P, in 1913, the nomenclature has been changed to A, B, C, and G, all built on the same chassis. Model G, however, differs from the others in that it has a new type of body, fenders and windshield. No radical changes are to be noted in the line, the motor being a four-cylinder, 4½ by 5¼, of the L-head type and with the cylinders cast in pairs. The electric lighting and cranking system is a North East and while right drive is retained, the control levers are placed in the center.

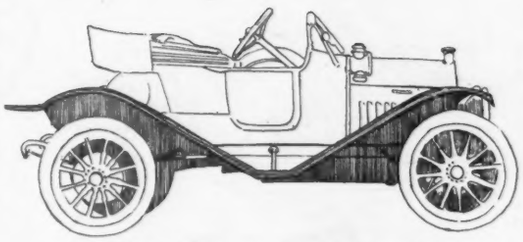
DAVIS

Two new chassis in the 1914 line

TWO new chassis, a four and a six and a carried-over four slightly improved is the line of the George W. Davis Motor Car Co., Richmond, Ind. The continued model known as the 50-A is identical with the 1913 offering except that a new type of radiator and hood are used and the body is equipped with a cowl board instead of the conventional dash. The tires are increased in size to 37 by 4½ inches from 36 by 4.

The new four appears in two body styles, the two-passenger roadster listing at $1,335 and the five-passenger touring offered at the same price. The motor dimensions are 3½ by 5 inches, the cylinders of L-head construction cast in block and thermo-syphon cooled.

The Westinghouse ignition starting and lighting system is in use on this model and the installation in the Continental motor is an extremely neat job. The running gear consists essentially of a disk clutch, selective gearset and three-quarter floating axle. The wheelbase is 112 inches,



Sweeping fenders on Herreshoff roadster

tires 33 by 4 and the drive left and control center. The platform rear suspension on this model is another feature which is out of the ordinary.

Another entirely new car offered by the Davis company for 1914 is the 6-50. This is of European design and selling at $2,150 in five-passenger form, with its D-shaped radiator, graceful cowl, clean running boards, bell-shaped body back and low rakish appearance assisted by the curved fenders, neat appearing dash and general constructional layout make it different from many of the sizes. A Continental motor of 3¾ by 5¼ inches is used and with the disk clutch and four-speed gearset make a standard power plant. The wheelbase of the new six is 128 inches, and the drive left with center control. Gray & Davis lighting and starting is stock equipment on this new Davis model.

DAY UTILITY

Really two cars in one

THE Day Utility car is really two cars in one, for although it is normally a five-passenger touring car, it may quickly be converted into a light delivery vehicle with a carrying capacity of from 1,000 to 1,500 pounds. Both front and rear seats are removable and when the vehicle is to be used as a delivery, these may be set aside and special delivery seat and body fitted in place. If desired, the rear touring car seat only can be removed, leaving the front seat in place. Thus the rear portion is available for carrying purposes, while a covering which is furnished with the car can be slipped over the front seat upholstery to protect it while the vehicle is doing its delivery work. A covered body is also furnished as an extra and takes the place of the touring body completely. Patent locks hold the seats in place and may be easily operated by the owner.

The Day Utility car, made by the Day Automobile Co., Detroit, Mich., is equipped with a four-cylinder 4 by 4.5 inch motor of the L-head cylinders cast in pairs, with a rating of 25.6 horsepower under the S. A. E. formula.

A peculiar feature of this power plant assembly is the placing of the 20-gallon gasoline tank directly over the motor and under the hood. This gives a very positive gravity feed to the carbureter and at the same time warms the fuel slightly before it is used. The tank is placed elsewhere if the customer desires, but such a change is advised against. The car has a multiple-disk clutch, three-speed gearset, floating rear axle, double brakes acting on 14-inch drums, right steer and center control. Its rear springs are three-quarter elliptic and the front semi-elliptic. It is equipped with 34 by 4-inch tires, has a wheelbase of 115 inches, and sells for $1,500 with body equipment for both passenger and delivery car use.

DE SOTO

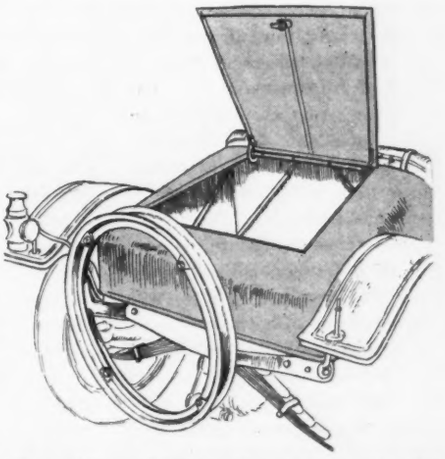
New six in the $2,000-class

THE DeSoto Motor Car Co., Auburn, Ind., has brought out a new six which is in the $2,000 class. This chassis is equipped with either a two, four, five or seven-passenger body and weighs 3,500 pounds. The wheelbase is 132 inches. The motor used in this car is the Beaver Six. It has a bore of 4 inches and a stroke of 5 inches. The cylinders are cast in pairs and are fitted with pistons which are provided with oil grooves. Electric lighting is provided on the car and ignition current is furnished by a Remy magneto, forming part of the dual system which is completed by a set of dry batteries. One of the novel features of construction of this car is the frame. For half its length at the forward end it consists of a double frame which is really a frame within the main frame. The sub-frame furnishes the three points of support for the motor, while the main frame consists of a channel beam which is over 4 inches in depth and 2.5 inches in width. The thickness of the stock is $\frac{3}{16}$ inch and the main frame is reinforced by broad and heavy gusset plates which are hot-riveted across the corners at the rear of the frame. The frame is a double drop. Thirty-six by 4 inch tires are carried all around and the wheels are equipped with Firestone demountable rims.

DETROITER

Larger motor used for this year

THE Detroiter in the new series is the same mechanically as heretofore, with the exception that the bore and stroke of the motor have been increased from 3.375



Hupmobile roadster provides carrying space for suitcases in rear deck

by 4.75 to 3.5 to 5 inches, raising the normal horsepower from 25 to about 32. Though selling for $900, as formerly, with full equipment, the Detroiter, made by the Briggs-Detroiter Co., Detroit, is now also offered at $1,025, with Remy cranking by electricity.

The new Detroiter motor is the same in general design as it was, the cylinders being of the L-head type, and cast in unit, with valve mechanism inclosed on the right side. The crankcase is of the barrel form with oil pan at the bottom. Bolting to the rear of the flywheel housing is the gearbox, and since this, as well as the multiple-disk clutch, are housed as a part of the motor, the unit power plant construction, so often used on cars of today, is made use of. The crankshaft of the Detroiter is carried on two ball bearings.

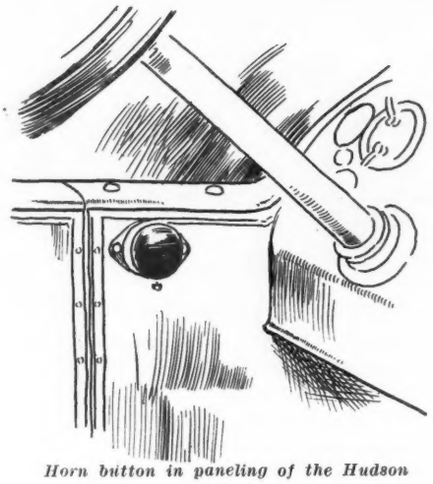
In the Remy electrical system fitted to these cars the ignition function is a part of the electric generator and mounted on the right side, driven by shaft. The electric cranking motor is separate and located at the front, driving the crankshaft through inclosed connection. The Detroiter company makes a point of the fact that the cranking outfit fits any Detroiter car, old or new. Those who have Detroiter cars may have this starter installed and thus bring their cars up to date, while the new owner may purchase his car at $900 without this advanced equipment, with the assurance that he may easily have the electric motor applied whenever he wants it for $125 more. When the Remy system is not supplied a high-tension magneto is fitted.

The tires are 32 by 2.5 inches in size on demountable rims. The wheelbase is 104 inches. Left drive and center control are featured. Besides the touring cars, a roadster of attractive type is built upon the Detroiter chassis.

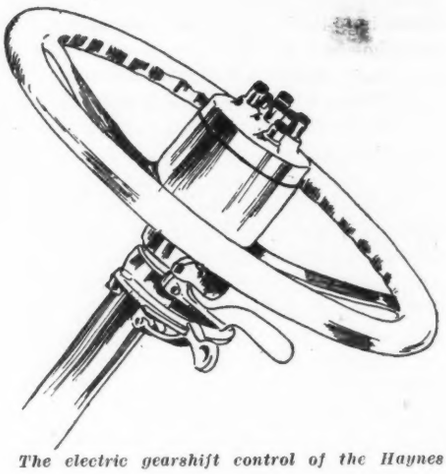
DISPATCH

Change made from air-cooling to water-cooled motor

ONE chassis with two styles of bodies, roadster and touring car, is the offering of the Dispatch Motor Car Co., Minneapolis. The chassis is 120-inch wheelbase and carries 36-inch tires, the five-passenger touring car selling for $900 and the two-passenger roadster for $850. Chief of interest here is the change from air-cooling to water, the motor being 3¾-inch bore and 5-inch stroke with the thermo-syphon system of cooling. The oiling system has been changed from gravity feed and splash to forced feed through copper tubes to the bored-out crankshaft and all bearings. Elliptic springs are used front and rear and emergency brakes have been installed as a complement to the foot brake, both sets being inclosed within the brake drum housing on the rear hubs. The rear axle is one-piece, the differential being a component part of the gearset which is located amidships. The axle is tubular and to it are braced the spring



Horn button in paneling of the Hudson



The electric gearshift control of the Haynes

seats, brake pivots and disks that inclose both sets of brakes. Two sets of annular balls are used in each wheel, one set ½-inch and the other ⅜. The Dispatch bonnet is out of the ordinary, the design being best described as a full length backbone 6 inches wide and 1-inch high. The top of the radiator and the cowl both have a riser to conform to this backbone and accentuate the length of the hood by this double extension. A design patent has been secured for this.

DORRIS

No radical changes on St. Louis product

EXPERIENCE in development behind Dorris cars extends over a period of 9 years which has been spent on a single chassis. In presenting its latest product, model I, the Dorris Motor Car Co., St. Louis, Mo., offers a car which shows numerous, though minor, changes from previous practice. The improvements are free from radical changes and experimental ideas, retaining all the proven Dorris features which have been refined from year to year with the addition of up-to-date equipment.

The four-cylinder overhead valve motor of 4⅜-inch bore and 5-inch stroke with its cylinders cast in pairs and the special Dorris dry-plate clutch in the fan flywheel, and three-speed gearset are retained as features of the Dorris unit power plant for this season.

Refinements incorporated in this year's motor consist in greater accessibility of camshaft gears, bearings and starter mechanisms due to a slight rearrangement of the motor accessories. A notable increase in power has been accomplished by the use of larger valves and freer exhaust. The dimensions of the exhaust pipe have been changed from 2¼ to 3 inches, this permitting a rapid escape of the exhaust gases and consequent less heating of the motor, it is claimed.

In the new Westinghouse starting and lighting system control features are built integral with the generator, eliminating a number of parts and extra wiring, thus making for simplicity. The starting motor is built integral with the engine. While Dorris engines have always been conspicuous for the smooth operation which has been improved by lengthening the connecting rods 2 inches so that they are now 12 inches long. The unusual lack of vibration is held directly accountable to this change and also to the lighter pistons by which possibility of the piston clink is eliminated.

Greater clutch area and consequent longer life has been obtained by adding a number of plates, thus compensating for the lighter springs which are being used. The lighter clutch springs require less effort when operating the clutch and is an added comfort provided expressly for feminine drivers.

In the gearset the general construction remains unchanged, retaining the three-speed selective set mounted on adjustable Timkin roller bearings. The principal improvement is the center control in conjunction with the left drive. The gear-change levers were in the center last year, but for this year have been moved far enough forward to allow the driver to pass the levers without interference.

A novel location for the gasoline tank is obtained by placing it lengthwise of the chassis at the left side immediately under the body. The filler cap and gasoline gauges are accessible under the front floor boards. Formerly the tank was hung at the rear as usual with pressure feed system, but the danger of damage by collision induced the Dorris engineers to place the tank where it would be both protected and inconspicuous.

The exterior or the body is noticeable for its graceful lines. The design is of the modish straightline type with no projections of parts and with clean running boards. The roomy tonneau with spacious doors makes for comfort, together with the unusually soft rolled edge upholstering. At the rear the body is hung, as formerly, on a platform type of spring which the maker believes, tends toward easy riding for the passenger.

Perhaps the chief feature of the equipment is the one-man-top with which the new cars are supplied. Another feature is the power-driven tire pump. The two

bodies fitted to the single chassis are a five-passenger car at $2,500 and a seven-passenger car at $50 more. These prices are the same as obtained last year.

DURYEA

Two roller-drive two-cycle chassis brought out

TWO roller-drive chassis with a number of detailed improvements are offered by the Duryea Motor Co., Saginaw, Mich. The two-cycle air-cooled motors in use on these chassis, which are similar in every respect but wheelbase, one being 86 and the other 96, have had the cylinder flange arrangement bettered so as to bring about more efficient cooling. The spark plug opening has been placed at one side of the cylinder so as to bring the spark in the deflector pocket, thus affording a better means of firing.

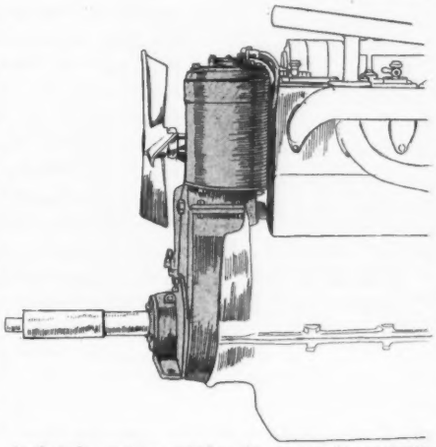
Aside from the motor changes mentioned, a few are to be noted in the running gear. The nut which holds the driving rollers to the shaft is on the inside instead of on the outside as previously. This permits the rollers to be closer to the spokes of the wheel. Another slight change has been made in the primer. Instead of drawing priming liquid from the main fuel supply, a separate priming can is provided which is designed to permit the use of some volatile liquid to gain easy starting. An important body change has been made in the cowl which projects back farther from the dash, thus offering more protection for the driver from the wind and rain. The Duryea is the only two-cycle pleasure car on the present market and the motor, a two-cylinder affair, has a bore and stroke of 3¾ by 3¾.

FALCAR

Roadster with original body lines

ORIGINAL body features have been brought out in the latest product of the Fal Motor Car Co., Chicago, which are in keeping with the desires of a number of buyers for a racy-looking car and yet one that is not awkward or in the freak class. The Grayhound may be transformed into a sleeper in a few minutes and has facilities for carrying all accessories in out of the way places.

The body of this new Grayhound roadster is streamline throughout. By pushing the seat cushion forward upon the footboards there is exposed sufficient room in the rear deck to admit a 6-foot person whose head is supposed to rest on the seat sushion. When not in use as a sleeping compartment the rear deck may be used as the extra tire-carrier.



Jackson's engine cranker is mounted vertically

The entire length of the sleeping portion is 8 feet and the height sufficient to permit of the sleeper turning. Altogether it is a most novel idea, well carried out.

A single headlight is placed in the center of the hood extension, the radiator being about 4 inches behind the light, and protected by the metal work. The headlight is adjustable by setscrews so that it may be tilted in any desired position.

Two fuel tanks are carried, one in the rear of the deck and another in the cowl, the gasoline being fed to the cowl tank by air pressure and then to the carbureter by gravity. The filler neck for the fuel is under the hood as is the water neck.

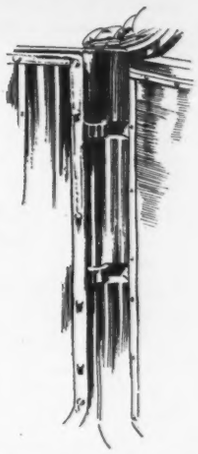
The car is equipped with a Buda motor, 4.25 by 5.5 inches, has a three-speed gearset and floating rear axle. The motor to wheel ratio is 3 to 1 on direct, the wheelbase 114 inches, and the tires 34 by 4 inches.

FIAT

Poughkeepsie concern offers four and six

THREE models known respectively as 54, 55 and 56, the first two of which are four-cylinder types and the third a six are put on the market by the Fiat Automobile Co., Poughkeepsie, N. Y. The Fiat design is distinguished by the fact that the motors are all of the block type, even the six-cylinder being a very short overall length. The bores of the four-cylinder models are respectively 110 and 130 millimeters and the strokes 150 and 170 millimeters. This gives motor sizes of about 4.4 by 6 inches and 5.12 by 6.75 inches for the four-cylinder cars. The six-cylinder car has made the same bore and stroke as the smaller four. The three models are rated respectively at 35 and 55 for the two fours and 50 for the six-cylinder car. The cylinders are all of the L-head type carrying the valves on the right side. The intake and exhaust manifolds are cast with the cylinders, the latter being entirely within the casting while the intake has merely a small outer manifold. Helical gears are used on all models to drive the camshaft while the magneto, water pump, etc., are operated from a transverse shaft.

Pressure feed lubrication is used, the oil being circulated by a gear pump. All motors have a centrifugal pump for water circulation and all use a honeycomb radiator with a fan formed by the pitched blades of the flywheel. Dual ignition system is used, the Bosch ZR-6 being used on the six-cylinder car and ZR-4 used on the two four-cylinder models All three models are equipped with the



Concealed door hinges in the new Jeffery cars

Westinghouse electric lighting and starting system used in connection with a Willard storage battery. Disk in-oil clutches are used, the friction faces being steel against steel and the clutch being housed back of flywheel. All models have four-speed selective gear-sets, geared direct on fourth speed. Model 54 has a high gear ratio of 3.28 to 1, model 55, 2.70 to 1 and model 56, 3.06 to 1. These reductions represent the ratios in the rear axle which in all cases are of the semi-floating bevel type with pressed steel housing. The wheelbase for models 54, 55 and 56 are respectively 123, 128 and 135 inches and all have 56 inches tread.

FIRESTONE-COLUMBUS

Few minor alterations are made

THE Columbus Buggy Co., of Columbus, O., has been content to confine its change to a few minor alterations and substitutions. The Gray & Davis starter is used now, the upholstery of the bodies made a little heavier, and a higher grade of springs is utilized to improve the riding qualities of the car. The product is marketed under the name of Firestone-Columbus, and includes four and six-cylinder models, in a variety of body styles.

There are two four-cylinder motors, the one used on the roadster, touring car, and three-passenger coupe has a bore of 4⅛ and a stroke of 5¼, while the 45-horsepower motor on the raceabout is 4¼ by 5. The six-cylinder motor has its cylinders cast in sets of three and has a 4⅛-inch bore and a 5¼-inch stroke. On the six-cylinder models on which there are five body styles, the Gray & Davis electric starter is fitted but the four-cylinder cars are not equipped in this manner.

FLYER

Newcomer is light and cheap four

THE Flyer, a brand new car for 1914, made by the Flyer Motor Car Co., Detroit, is a light four-cylinder water-cooled car which has the distinguishing features of selling for but $550, which includes the electric starter and lights, and weighing, when fully equipped but 750 pounds. A block motor having a bore of 2.75 inches and a stroke of 4.5 inches is used. This miniature power plant unlike most small

motors is cooled by a pump-circulated water system. The crankshaft is carried on three bearings and a vacuum-feed oiling system is used in which the lubricant is automatically maintained at the same level, and fed by the splash of the connecting rods.

This car is not in the cyclecar class as it is a real motor car throughout. The multiple-disk clutch transmits the power through a two-speed selective sliding gearset, which is inclosed in a housing bolted to the crankcase, to a 1.125-inch driveshaft. The shaft is inclosed by a torque tube 1.75 inches in diameter. The rear axle is a bevel type geared at a reduction of 3.5 to 1. The front axle is tubular.

The control system by which the steering and driving of the car is manipulated is thoroughly up to date in every particular. The steering wheel is on the left side of the car and the steering motion is imparted by a hardened worm. The steering column is 2 inches in diameter and the steering wheel 15 inches. Advantage is taken of the long cowl to mount the gasoline tank in this advantageous position, a good gravity head for the fuel flow thus being secured. The capacity of the tank is 10 gallons.

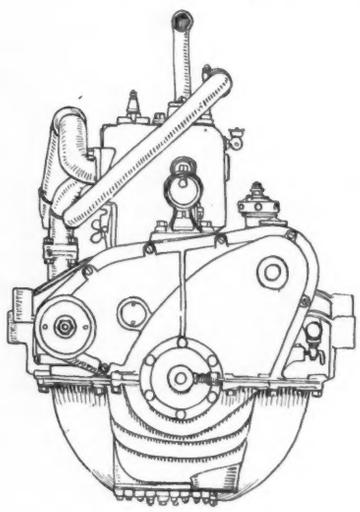
A racy appearance is given the car by its relatively long wheelbase of 100 inches and the full set of 28 by 3-inch wire wheels. Two sets of brakes are provided, the hand brake lever and the gearset lever are both mounted in the center.

FORD

Little car continued without change

THE Ford car which is standardized and which was produced to the extent of about 180,000 cars for last season is to be continued on an even larger manufacturing scale this year by the Ford Motor Co., Detroit. Roadster, touring car and town car are offered on the 100-inch wheelbase chassis, the prices being $500, $550 and $750 respectively.

The motor is a four-cylinder block-cast type with the waterjackets and upper half of the crankcase integral with the cylinder casting. The lower half of the crankcase, which is a one-piece pressed steel affair, is extended so as to form the bottom housing for the entire power plant. The cylinder size is 3.75 by 4, the same as heretofore.



Forward view of the Imperial engine

There are four complete units to the construction of the Ford chassis. These are the power plant, the front axle, the rear axle and transmission parts and the frame. In the scheme of design used, each unit is suspended at three points of the chassis, making a flexible whole.

The clutch is a multiple-disk running in oil and this together with the flywheel-magneto are housed integrally with the motor.

The Ford car has a planetary transmission of the spur gear type and the control and steer are on the left side. There are three pedal controls operating the low, high and reverse speeds and brake on the transmission. The hand lever for neutral and the emergency brake lever are on the left. Besides the service brake on the transmission, the emergency acts on the rear wheel drums. Both front and rear springs are of the semi-elliptic transverse type.

With the Ford triangular drive system, drive and axle shafts, universal joint and driving gears are all inclosed within a housing as a unit. The Ford differential is of the three-pinion bevel type, and a tubular steel housing incloses it together with the vanadium steel axle shafts.

The Ford cars have 30 by 3 front and 30 by 3½-inch rear tires, and all cars put out by this big Detroit concern are sold completely equipped.

FRANKLIN

Air-cooling car on one chassis

ONE chassis with six different body types constitutes the entire line of the H. H. Franklin Mfg. Co., Syracuse, N. Y., for this season. The new series is known as the Franklin Six-Thirty and includes a six-cylinder motor mounted on a chassis which still maintains the feature of lightness that has characterized the Franklin line for some time past. Many constructional changes have been made this year. The car now has left drive and center control. The motor has been improved by fitting a compensating valve mechanism which takes care of the overhead action in such a way that compensation is made for difference in temperature and the clearances change but little as the motor becomes warm. The valve-lifter rods are now inclosed with the result that the motor is much more quiet in operation. The long overhead walking beam support which formerly extended over all the cylinders has been eliminated. Each cylinder is now an independent unit which can be removed without disturbing any other. Another change is in the timer, magneto and generator gears which are now located in the front cheek piece of the motor in the same housing that contains the silent chain of the Entz motor-generator. The car is equipped with electric lighting and starting systems. The running boards are clean, the tool box being carried between the running board and the sill folding down on the running board when open. The bodies which are furnished are a five-passenger touring, three-passenger roadster, coupé, sedan, limousine and berlin.

GLIDE

Electric starter only change announced

EXCEPT to include an electric starter, no change whatsoever has been made in the Glide, manufactured by the Bartholomew Co., of Peoria, Ill. The addition of the starter jumps the price somewhat, the new figure being $1,840 as against $1,690 which represents the difference in cost between the old equipment and the new.

The Westinghouse starting and lighting system has been adopted and in addition to this the Glide features include a unit-power plant, long-stroke motor, inclosed valves, center control, left drive, and a motor-driven tire pump. The motor is of the four-cylinder type, 4⅛-inch bore and 5¼-inch stroke and cast in block, giving a rating of 38 to 42 horsepower. The wheelbase is 118 inches.

GRANT

New small car weighs 1,000 pounds

THE Grant car which was a newcomer to the industry last summer has a four-cylinder motor, driving through a cone clutch and propeller shaft to a two-speed gearset mounted in unit with the rear axle which has a gear differential and bevel driving gears. It is made by the Grant Motor Co., Detroit. The car weighs about 1,000 pounds total and is capable of a speed of 50 miles an hour, according to the maker.

The motor is a 2.75 by 4 L-head block cast type. The cylinders and crankcase are cast in one piece, thus making for simple production. The crankshaft and its bearings are accessible through a cover plate at the bottom. The horsepower is 16 at a normal crankshaft speed of 1,600 revolutions. The manifolds are cast integrally with the cylinders and with water jackets also an integral part, thermo-syphon cooling is used. The cylinder heads are removable in one piece, fourteen bolts holding this plate in place. It carries spark plugs, priming cocks and water outlet connections. The lubrication is by the splash system, the oil being carried in a 2-quart reservoir.

The flywheel is uninclosed and back of it is the cone clutch which connects with the inclosed propeller shaft with its universal joint at the front end. The rear axle with which the gearset is a part is three-quarter floating and carries two sets of brakes. The gear ratio is 4.5 to 1 on high.

A single half-elliptic transverse spring carries the frame at the rear, while ellip-

tic front springs take care of the front end. The fronts are 26 and the rear 47.5 inches in length.

The drive is on the left and the control levers in the center. The little machine, which is made in roadster design only, has ample room for two passengers without interference with the control parts. The gasoline tank is under the cowl and holds 6 gallons, which should run the car from 180 to 200 miles, it is stated.

The car sells for $495 equipped. It has a streamline body with a rounded nose radiator; has wire wheels carrying 28 by 3-inch tires and its wheelbase is 90 inches.

GREAT EAGLE

Electric cranking, left drive, center control

GREAT EAGLE cars are not subject to yearly model changes. The engineers of the United States Carriage Co., Columbus, O., make a custom of applying changes whenever it is found that the cars can be improved without waiting an entire season before making the change. This system is made possible by the fact that most of the production is special work, each car being built as a separate unit instead of a number being turned out at one time exactly alike.

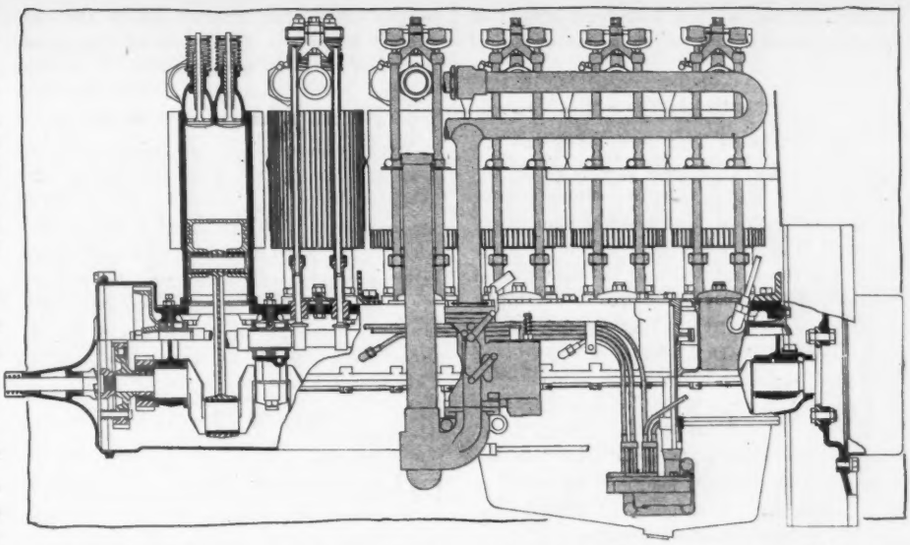
The only changes of the past 12 months in Great Eagle construction are in the adoption of an electric lighting and cranking system and a change in the driver's position. The general tendency to left drive and center control enabled the factory to change to this feature from the older right drive and right control. The company has been producing cars of this newer construction for the past 5 months.

As continued for the new season the car appears as a four-cylinder car having a T head motor of 4¾ by 5½ inches bore and stroke, giving it an S. A. E. rating of 36.1 horsepower. The motor has cooling water circulated by a pump and a pressure oiling maintained by a gear pump. The ignition is double and an Auto-Lite cranking and lighting system is supplied. A cone clutch is used and a three-speed gearset located amidships. The other points of construction include a floating rear axle, 37 by 5-inch tires, platform type of rear springs and roller bearings throughout gearset, axle and wheels. Bodies fitted include a seven-passenger limousine at $4,000, a ten-passenger limousine at $4,250 and a seven-passenger touring car at $3,500.

GREAT SOUTHERN

Concern concentrates on one model

CONCENTRATION upon a single car marks the program of the Great Southern Automobile Co., Birmingham, Ala. Discontinuance of the smaller car, formerly marketed by the company is the chief alteration of this factory for the new season. The model which has been dropped was known as the Great Southern 30. The other chassis, known as model 51 last year, and now bearing the title model 50 and carrying a seven-passenger touring body, forms the sole object of this factory's efforts.



Sectional and exterior view of Franklin air-cooled engine showing operation of the overhead valve and the vertical fins on the cylinders

Alterations in this model are of minor significance except the change to center control and the provision for the installation of any standard type of motor starting and lighting system. The model 50 is a four-cylinder car of 5.19 by 6 inches bore and stroke giving the unusually large S. A. E. rating of 43.05. The cylinders are cast in pairs and are of the L head type. Water is circulated by a pump and a combination of splash and pressure lubrication is obtained by a gear pump. Ignition is dual. The transmission system includes a cone clutch, a three-speed gearshift amidships of the frame, and a semi-floating rear axle. The wheelbase of the car is 128 inches and tires are 36 by 4 inches in front and 36 by 4½ inches in the rear. The rear springs are three-quarter elliptic.

The steering wheel remains on the right side, while the control levers have been shifted from the right side of the driver's compartment to the center. The car is listed at $1,750 with the option of any standard make of cranking apparatus at extra cost. This price is a reduction of $350 from the list price of last season.

GLEASON

Only two-cylinder four-cycle in U. S.

AS the only two-cylinder car and likewise the only buggy-type car of the four-cycle type on the American market, alterations in the constructional features of the Gleason cars made by the Bower Machine Works Co., Kansas City, Mo., are very slight. There have been no changes in the car as it appeared last year except that an emergency hand lever brake now is provided instead of the pedal arrangement employed formerly, the torque bar and a few other minor points have been strengthened.

The two cylinders of the engine have a bore of 4¾ and a stroke of 4 inches, having an S. A. E. rating of 18 horsepower. The cylinders are of the L-head type, cooled by thermo-syphon water circulation. Transmission features include disk clutch, three-speed gearset and shaft drive to floating axle. The gear ratio on high is 6 to 1, half again as much as that usually employed in four-cylinder cars. The wheelbase is 96 inches and the tires are solid 36 by 3 inches. The Gleason sells at $850 as a two-passenger roadster and $1,000 as a five passenger touring.

GREAT WESTERN

Two chassis of different wheelbases

AN addition to the line of the Great Western Automobile Co., Peru, Ind., is a chassis with a wheelbase of 112 inches, for which six-passenger, sedan and limousine bodies are offered. The one carried over has a wheelbase of 118 inches and the body offerings include roadster and four and five-passenger touring bodies. The bodies all have been redesigned and there are such refinements as combination dimmer headlights carrying two sizes of lamps and controlled by a switch. Right hand drive and right hand control are retained.

The roadster and four and five-passenger touring cars list at $1,585 without a starter but otherwise with full equipment, while the starter, a Gray & Davis, calls for a list of $1,710 on the model. The six-passenger lists at $1,875 without starter and $2,000 with, while the sedan is quoted at $2,250 without starter and $2,400 with.

The power plant is the same as before with a few improvements. For instance, the brakes have been changed from double internal to internal external. It is a L-type four-cylinder 4¼ by 5½, with the cylinders cast separately and with the valves inclosed. The Gray & Davis electric starting and lighting system is mounted on the left side of the motor and drives through steel gears. As a starter it operates at one-twenty-fifth crankshaft

speed. It delivers its maximum output of 20 amperes at 6 volts at a car speed of 12 miles per hour.

G. J. G.

Racing model only one announced

SO far the complete program of the G. J. G. Motor Car Co., White Plains, N. Y., for the new year has not been made known. The only car upon which information has been given out is the special racing machine. This is a stripped chassis, especially equipped for high-speed work with which a speed of 70 miles per hour is claimed. The engine is a four-cylinder, 4¾ by 5-inch motor with cylinders cast in pairs. The clutch is of the leather-faced cone type with springs beneath the leather designed to make a quick getaway. A three-speed Brown-Lipe gearset is supplied and a floating rear axle. Special magnetos and carbureters intended for high-speed work are supplied. The wheelbase is 121 inches, tires are 34 by 4 inches and though wood wheels are regular equipment, wire wheels are offered as an option.

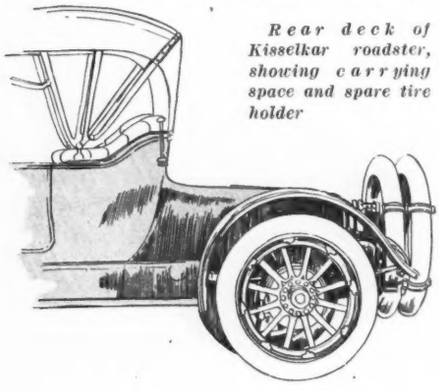
HAVERS

Continues as advocate of sixes

CONSISTENT with its policy of making six-cylinder motor cars exclusively, the Havers Motor Car Co., Port Huron, Mich., continues for this year its two sixes, namely, a large design rated at 60 horsepower and a smaller car at 44 horsepower. Except for a few minor refinements mechanically, the slight increase in the size of the motor in the larger car and the bringing of the body designs up to the minute, the new Havers cars are the same as last season. Right drive is retained.

The large 6-60 model which features the line is now in its second year, the dimensions being 4.125 by 5.25, as against 4 by 5 last year, giving rise to the change in model designation from 6-55 to 6-60. No changes in the actual design of the motor are to be found, but the Gray and Davis starter is added. The smaller six retains its 3.75 by 5 power plant without change. The cylinders are L-head constructed with inclosed valves on the left.

Throughout both chassis the same design is found, and save for the difference in dimensions, there is no structural deviation. The unit power plant includes flywheel, clutch and gearset which are completely housed in extensions of the crankcase and portions which bolt to it through flanges. The clutch is a multiple disk type and the gearset a three-speed one.



Rear deck of Kisselkar roadster, showing carrying space and spare tire holder

With wheelbase of 122 inches for the 6-44 and 128 for the 6-60, the Havers cars are given plenty of room for bodies which are in accord with the latest body maker's ideas. The cowl board of the 6-60 model is exceedingly well arranged and attractive. Running boards are clean and fenders have been given a new curve to conform more closely to the wheel curves. This model has a Jones starter.

HERRESHOFF

Four and a small six brought out

HERRESHHOFF Motor Co., Detroit, makes two chassis models this year, these being a four and a small six. A six was offered for the first time for the 1913 season by this company. To these two chassis are fitted any desired type of body.

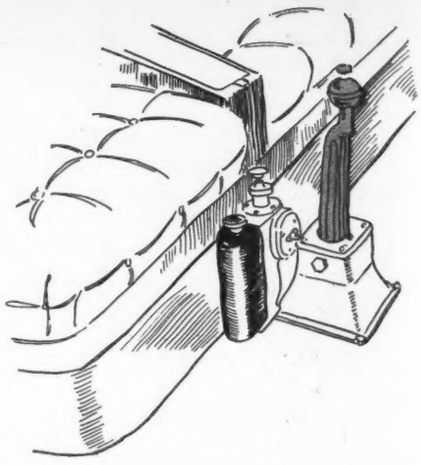
Though essentially the same in design and construction as the cars offered for 1913, the new models have several refinements and improvements, chief of which are the complete electrical equipment for cranking, lighting and ignition and the incorporation of four-speed gearsets in all models.

Aside from the application of this electrical system, which is of the Westinghouse make of the two-unit design, motor and generator being separate, the engines show no noticeable changes in design or arrangement of essentials. Both the four and the six have 3.375 by 4.5 motors, and are rated at 30 and 40 horsepower, respectively. Although the six is a T-head type, while the four-cylinder is an L-head design, the same general characteristics of construction are in evidence on each. Differences due to manifold arrangements occasioned by the different cylinder castings are of course necessary, but as to crankcase construction, methods of attaching the gearbox for the unit power plant feature, and so on, show that they are similar.

The multiple disk clutch and four-speed gearset are identical for both cars as to design, although the six has more plates to its clutch—twenty-four, as against twenty for the four-cylinder model. The drive shaft of these cars is inclosed within a torsion tube with a universal joint at the front end. Radius rods run diagonally from the rear axle to the tube to aid in the maintaining of alignment. The rear axle is semi-floating.

The main point of difference in the two chassis is the spring suspension. The six-cylinder model has a platform rear hanging, and the four has half-ellipties shackling to spring horns at their rear ends.

The wheelbase of the six is 124 inches, while that of the four-cylinder touring car is 110 inches. The roadster four-cylinder has 100 inches for this dimension.



Forward compartment of new Keeton, showing the cranking button at front of seat

The Herreshoffs have demountable rims with one extra and equipment is complete in all details. Tires are 34 by 4 on the six and 32 by 3½ on the four.

HAYNES

Two sizes and four; electric gearshift

TWO sixes and a four are made by the Haynes Automobile Co., Kokomo, Ind., this season. All three models incorporate the electric gearshift, a feature which has just been added to the line put out by this company. The motor and chassis dimensions remain the same throughout as last season and only a few changes of a minor nature remain to be recorded. A new pressure-feed gasoline system supplants the gravity tank. A power tire pump has been added and the body lines have been changed to bring them up to the dictates of this year's style.

Models 26 and 27 are the six-cylinder cars and model 28 is the four. The power plant dimensions of the sixes are the same, 4.25 by 5.5, and the similarity of the design is carried throughout except for a difference of 6 inches in wheelbase and the consequences of this dissimilarity. The larger bodies are to be found on the longer chassis.

The cylinders are cast in pairs and are offset from the natural axis .5 inch. The compression by gauge on these motors averages 59 pounds and on factory dynamometer tests a maximum horsepower of 65 has been secured. Four main crankshaft bearings are used, 11-inch connecting rods, a valve system operated through spiral gears.

The electric equipment includes a dual system of ignition and a Leece-Neville cranking and lighting outfit. The running current is furnished by a Simms magneto. The Haynes contracting band clutch is continued, a hardened steel band contracting on a hardened steel drum. The gearset is carried on Timken roller bearings. The rear axle is a floating design and both sets of brakes are on the rear wheels.

The four-cylinder model follows the de-

sign laid out above exactly. Three instead of four main bearings are used in the crankshaft and lighter parts where possible are used. The rear axle is a McCue and delivers the drive through a flange instead of the jaw clutch.

HENDERSON

Six-cylinder used for first time

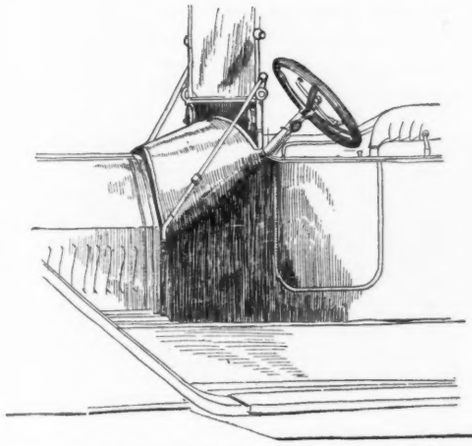
ADOPTION of the six-cylinder car for the first time is a feature of the Henderson product for 1914, made by the Henderson Motor Car Co., Indianapolis. In addition to the new six there is a new four called the de luxe, while the light four which was the sole chassis model for 1913 is retained. The new six-cylinder model has a 3.75 by 5.5 motor. The de luxe four has cylinders 4.125 by 5.5 inches in size. The light four which is carried over from this year with minor refinements is of the same bore as the new four, but its stroke is only 5.25.

The three models are all of the same general chassis layout, differing only in power. These are furnished in five-passenger, touring, roadster, coupé and sedan body. Wheelbase of the three models for the new season are: six, 126 inches; de luxe four, 116 inches, and little four, inches. Tires on six and de luxe are 35 by 4.5 inches and 34 by 4 on the light four-cylinder.

With the new four and six-cylinder cars an option of either wood or wire wheels is offered without change in price. In addition a kerosene carbureter is named as optional equipment at a slight extra charge.

Motor starting is by a Ward-Leonard electric cranking and lighting system the same as last year. The hood is shorter in the new cars in proportion to the size of the body and the dash gasoline tank is slanted down and inwards to give more knee room in the front compartment. A lock has been added to the gearshift lever to hold the second speed gears in mesh. The fuel filler pipe comes out of the dash in the new car instead of the top of the cowl, as in former practice, making for ease of filling.

The Henderson center control and left drive continues in the 1914 series, the central control lever being placed between the two front cushions and instead of the conventional H-quadrant being placed in the horizontal frame it is mounted vertically and the lever moves up and down and forward and backward. Brakes on the new cars are concentric expanding; the older model has the bands side by side. The Stutz rear system is used on fours, but the six and de luxe models have Weston-Mott floating axle with Covert gearset.



Illustrating the smooth line of Klinekar's cowl dash

HOLLY

Four body types on six chassis

A NEW chassis known as model A-1 has been put on the market by the Holly Motor Co., Mt. Holly, N. J. This car, which is known as the Holly six, is turned out in four body types, including a runabout, two touring models and a demi-tonneau. The six-cylinder motor is rated at from 45 to 60 horsepower and is a 4 by 5. The cylinders are cast in threes and carry the intake valve on the right side and the exhaust valve on the left side. The camshaft is driven by spiral gears. The exhaust and intake manifolds are cast separately and are removable. A splash system of lubrication in which the oil is circulated by a gear pump provides the motor lubrication, while the cooling is taken care of also by a gear type of water pump, which forces the cooling liquid through a honeycomb radiator.

The electrical equipment consists of an electric starting system if desired and a dual-double ignition system provided with two sets of spark plugs. If desired an air starting system will be fitted instead of the electric. The Ward-Leonard system is used for the electric lighting of the car regardless of which starting system is provided. The gearset is in a unit with the rear axle and provides three forward speeds giving a ratio of 3.25 to 1 on third or direct. The gearshift control is in the center as is also the emergency brake lever while the steering gear is mounted on the left. The wheelbase of the car is 130 inches and the tread 56 inches. A semi-underslung frame is used while the rear springs are semi-elliptic underslung. The weight of the chassis is 3,500 pounds.

HUDSON

Only six-cylinder models made

ONLY six-cylinder models represent the Hudson Motor Car Co., Detroit, this year, it having retired from the four-cylinder field entirely. The model 37 four-cylinder type of 1913 is no longer made. The model 54 six-cylinder car is continued with a number of chassis and body changes, and late in the fall a light six was announced as a running mate.

This latest Hudson is known as model 40, and is really brought out in competition with the average high-grade four-cylinder vehicle now on the market. With a weight of 2,940 pounds, the car is said to be lighter than some of these fours, and its gasoline consumption is claimed to be nearly as low as that of the model 37 four. The price of this model is set at $1,750 in touring and roadster designs.

The Six-40 has practically the same type of stream line appearance as has the Six-54, which appeared earlier, although it has a full rounded top hood, as compared with the larger six's type, with a ridge where the top part meets the sides. There are no side lights on the Hudsons, the headlights having provision for dimming for city driving.

But though in outward appearance the new Six-40 is similar to the Six-54, its mechanical design is somewhat different. The motor is a 3.5 by 5-inch rated at 40 horsepower. The cylinders are in threes with L-heads. The gearset bolts to the rear, making a unit construction. The flywheel is semi-inclosed, which is a new feature to Hudson design. The clutch is a multiple-disk type, and the gearset has three forward speeds.

The car is equipped with the Delco electric system for ignition, lighting and cranking. Left drive and center control are featured, as is also the location of the gasoline tank underneath the cowl.

The drive of the Six-40 is entirely new to Hudsons, being of the Hotchkiss type, whereby the propulsion is taken through the rear springs. No torsion rod or tube appears, and the drive shaft, which is fitted with a universal joint at either end is a varying sectional diameter. It tapers from a diameter of 1.75 inches at the center to 1.25 inches at the ends. This varying section protects the shaft against whipping action, which ought to take place in the ordinary shaft of its length—64 inches. The three-quarter elliptic rear springs are underslung, and the frame is tapered from front to rear, instead of being of the bottle-necked form. This makes a cheaper construction, and at the same time is equally as good as any other shape. The rear axle is of pressed steel and floating, while the front axle is of a new type, being of the so-called inverted Lemoin construction, whereby the spindle is at the top of the knuckle, instead of being at its center as in the conventional design. This makes for a flatter axle and simplifies the forging. The speedometer gears are also inclosed in the front spindle. The wheelbase of the Six-40 is 123 inches.

Besides the open bodies a cabriolet roadster is also furnished on this chassis at an extra cost.

The Six-54 retains its 4.125 by 5.25 motor, L-head with the cylinders in threes, and like the Six-40 is made by the Continental company for the Hudson cars, according to the Hudson company's designs. The Delco electrical system is also a part of this motor, taking care of all three functions.

The three-speed gearset formerly used has been replaced by a four-speed type with direct on third. The propeller shaft is un-

inclosed and has two universal joints. A torsion arm parallels it back to the axle housing. The rear axle is floating, while a new feature this year is the mounting of the springs underneath, giving a greater range of spring movement.

The frame tapers from rear to front as does that of the Six-40, and also similar is the mounting of the gasoline tank under the cowl. Left drive and center control also is used this year, the 1913 Six-54 having right drive and control. The whole body design echoes the general lengthening out of the chassis from a wheelbase of 127 inches in 1913 to 135 inches in the new model. The price of the new 54 has been decreased somewhat, it being now offered for $2,250, as against $2,450 last year. Equipment is complete in every detail.

HOWARD SIX

Six-cylinder five-passenger model

A SINGLE chassis model carrying a single type of body is the feature of the product of the Howard Motor Car Co., Connersville, Ind. This is a six-cylinder, five-passenger touring car of conventional lines and design except for one or two special departures from common practice. A Continental motor of 4⅛ inches bore by 5¼ inches stroke, which factory tests show delivers 60 horsepower on the block at 15,500 r. p. m. is the motive power. A departure from standard practice is in the exhaust system in which there are two manifolds, two flexible exhaust pipes and two separate mufflers, so arranged that successive cylinders in their order of firing exhaust into alternate mufflers, thus obviating the chance of exhaust gas diluting the incoming charge of fresh mixture. The steering wheel is on the left side and the control is central, a unique form of quadrant being employed. Instead of the usual latch to prevent shifting into reverse the slots are curved to make forward shifts easy, whereas the first requires a side shift unlikely to be made without premeditation. The cone clutch, 36 by 4½-inch tires and the other portions of the design show conventional practice.

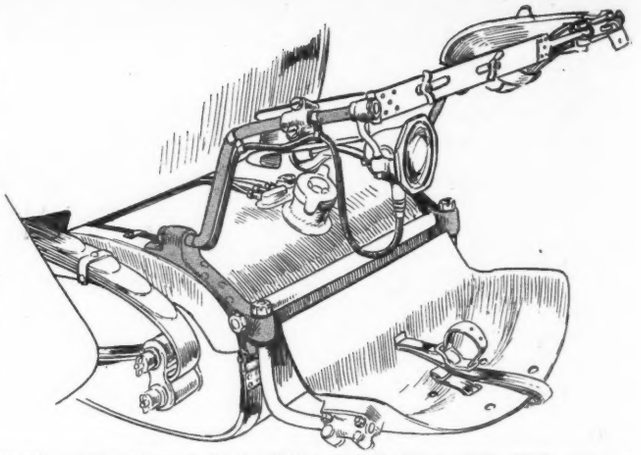
HUPMOBILE

Small car dropped; 32 continued

HUPMOBILES of 1914 are very little changed in appearance or in general design over those of the preceding year, except that the smaller Hupmobile 20 is discontinued.

Four body styles of the passenger variety are fitted to the 32 chassis by the Hupp Motor Co., Detroit, these being the roadster, four-passenger, six-passenger and coupé cars. All of these are of 106 inches wheelbase except the six-passenger job, which requires that the chassis be lengthened to 126 inches wheelbase.

All of characteristic features which have been incorporated in this model 32 from the first are retained. Its rear spring suspension by the use of a cross spring which hangs at its ends in ball shackles attached to the axle housing and connects at its center with the rear cross-member of the frame is retained. The block-cast motor of the 32 is a 3.25 by 5.5 with L-head cylinders and thermo - syphon cooling, using the flywheel as a centrifugal pump to bring the oil up to a level from which it can be circulated by gravity. The Bosch high-tension ignition and other features are unaltered.



Solid construction of Locomobile's combination fuel tank support, spare tire holder and rear light standard

Mechanically, the greatest difference in the new 32 comes in the addition of Westinghouse electric cranking and lighting employing separate electric motor and generator which are inbuilt into the power plant. The generator driving mechanism and the gearing between the cranking motor and the flywheel ring gear are all inclosed within housings which are integral with the upper half of the crankcase.

The camshaft of the 32 is driven from the rear of the crankshaft by a silent chain. The magneto position is also unusual, that unit being mounted on top of the gearset case, and driven by a silent inclosed chain from the camshaft. Due to this position the magneto extends through the dash, being covered by an easily removable casing.

The car has a three-speed gearset, multiple disk clutch running in oil, propeller shaft inclosed within a torque tube, floating rear axle and its gasoline tank is under the cowl. The bodies are the same as used heretofore.

ILLINOIS

SPECIALIZING on a five-passenger touring model which is a continuation of the K-13 of last year but which is now known as K-14, the Illinois car, made by the Overholt Co., Galesburg, Ill., has but minor change. It is fitted with a compressed air starting system and has right drive with the gearshift control in the center and emergency brake on the right side. The four-cylinder power plant has its L-head cylinder cast in pairs, the valves all being on the left side. The motor size is 4.25 by 4.75 and it has a three-bearing crankshaft. The motor is lubricated by circulating splash system in which the oil is carried by a gear pump. The ignition is Remy dual, using the high-tension magneto for running current and dry cells for starting. The carbureter is the Schebler to which the gasoline is furnished from the tank at the rear of the chassis by pressure. The clutch is a multiple-disk with all steel plates running in oil. The gearset is a three-speed selective located amidships. A floating bevel gear rear axle is used and the wheels are 37 by 4 all around. They are fitted with demountable rims. An acetylene tank is included in the equipment, as is also a tire inflating outfit. The wheelbase is 120 inches.

IMPERIAL

Four models of chassis continued

THERE still are four models of chassis bearing the Imperial name. Three of these are four-cylinder types, but in the new series two fours and two sixes are offered by the Imperial Automobile Co., Jackson, Mich. The model numbers are exactly the same as they were. Model 54 is the big six; model 44, which heretofore had a four-cylinder engine, is now the light six; model 34 is the larger of the fours, and models 32 and 33 refer to four-cylinder touring car and roadster bodies fitted to the same four-cylinder chassis.

Each of the four chassis is equipped with a different power plant than it carried heretofore. Model 54 has a 4.125 by 5.25 engine, which replaces a 4 by 5.5. Model 44 is fitted with a 3.75 by 5.25-inch six, instead of its former 4.75 by 5.25-inch four. Model 34's new engine is of the same bore as the old one—4.5 inches, but the stroke is now 5 inches, or .25 inch shorter. The 4.125 by 5.5-inch power plant of the 32-33 chassis has been replaced by a 4.25 by 5.25-inch model.

Whereas, all cars except the larger six, model 54, were driven from the right in 1913, all 1914 Imperials are left-driven. Center control is continued. Splitdorf dual ignition is now fitted, while North-East lighting and cranking is fitted to all models as a standard feature.

The new engine in the model 54 has cylinders cast in threes instead of being a block casting as formerly. The engine incorporates the multiple-disk clutch and three-speed gearset in unit with it, making the three-point suspended power plant construction possible. Its electric unit for cranking and lighting is placed on brackets on the side of the crankcase, and on the end of the pumpshaft. The connection between this and the engine is by silent chain to the crankshaft.

The driveshaft is fitted with two uni-

versals and is paralleled at the rear by a torsion arm. The rear axle is floating and has a pressed-steel housing. Brakes are double-internal expanding. The car has a wheelbase of 137 inches and runs on 36 by 4.5 tires. The standard body is a seven-passenger type of latest design.

Model 44 is the same in general appearanc as last year, but its wheelbase has been lengthened from 122 to 126 inches to accommodate the six-cylinder power plant now used. The engine is of the same general design as that of the larger car. It has cylinders in threes, and the same type of cooling, lubrication, ignition, lighting and cranking systems. But unlike the big six, the drive is through a propeller shaft inclosed within a torsion tube. Diagonal radius rods are also used. The rear axle is floating and of the same design as used on the big car. The tires are 36 by 4.5 inches. A touring body is the standard dress.

The unit construction of the engine, disk clutch and three-speed gearset are also features of the forward unit of the model 34 four-cylinder model. Cylinders are in pairs and L-heads. Lubrication is by constant-level splash, while ignition is of the dual type. Instead of driving through chain connection at the front, as in the two sixes, the motor-generator used for cranking and lighting on this model drives by chain at the rear, the crank-shaft sprocket being just inside the flywheel flange. The rear construction and drive of this model is similar to type 44. The rear axle is floating and has a malleable housing. The wheelbase is still 118 inches, and the body a five-passenger design. Tires are 34 by 4 inches.

Model 32-33 is a machine of 114 inches wheelbase, and the motor is a block casting like its predecessor. The clutch and gearset are in unit with it. Lubrication and ignition are the same type as used in model 34, but the electric unit drives through chain at the front end, being mounted back of the water pump on the right and connecting to the pumpshaft. The disk clutch has semi-steel plates and the gearset three speeds. The propeller shaft is inclosed and the rear axle a malleable-housing affair of the floating type. Both the touring car model 32, and the roadster, model 33, are fitted with 34 by 4 tires.

INTER-STATE

Six continued; another anticipated

ANNOUNCEMENTS of the Inter-State Automobile Co., Muncie, Ind., thus far show the construction of the 6-45 made last year. The makers state, however, that they shortly expect to bring out another model. The model 43 is fitted with a touring car body having five-passenger capacity and house a power plant which the makers rate at 48 horsepower. The motor is in unit with the clutch and gearset and has the six 4 by 5 cylinders cast together. They are L-head and have the valves on the left side. The manifolds are cast separately. The motor is cooled by water circulating system maintained by gear pump and a honeycomb radiator. The ignition is a double high-tension Mea having the magneto as a running current source and the same battery as is used in the Apple electric lighting and starting system for starting.

The Apple system is fitted regularly to the cars and operates at 6 volts. The carbureter is either a Stromberg or Carter without hot air pipe and fed by pressure in the 20-gallon gasoline tank located at the rear of the chassis. The clutch which is housed in the flywheel and which is a unit with the gearbox is a multiple-disk running in oil, alternate disks being faced with raybestos. The gearset is selective sliding and provides four speeds. The rear axle is floating and delivers the drive through the rear springs. Left drive and center control are used, the wheelbase is 132 inches and wood wheels fitted with demountable rims are supplied as regular equipment. One extra demountable rim is given with the car.

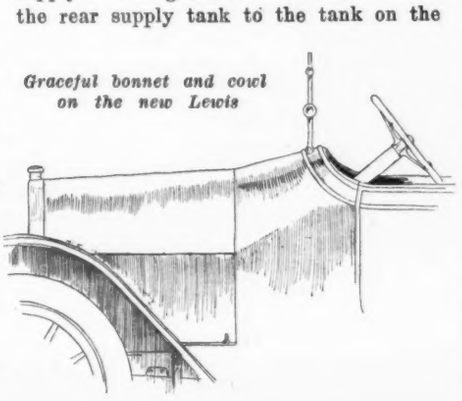
JACKSON

Olympic, Majestic and Sultanic Retained

THREE Jackson models, all practically the same as the three models offered last year by the Jackson Automobile Co., Jackson, Mich., are on the market for 1914. They bear the same names, Olympic, Majestic and Sultanic, and neither the first two, which are fours, and the last, which is a six, have been changed to any great degree other than bringing their equipment and design up to date in all respects.

In view of this the Olympic, the smaller of the two fours, is now fitted with an electric cranking and lighting system and sells for $1,385 in place of $1,500, the price of last year. The Majestic now sells for $1,885, a reduction of $90 as compared with last year, and the Sultanic six is now in the $2,000 class, having been reduced in the five-passenger model from $2,500 to $2,150.

Practically the only chassis change is the removal of the pressure gasoline tank from the rear of the Olympic. On the 1913 model there was, besides the service tank on the dash, a storage tank at the rear which carried the bulk of the gasoline supply. The gasoline was forced from the rear supply tank to the tank on the dash and flowed to the carbureter by gravity. On the Olympic car for this year only the dash tank is used. The larger four-cylinder model and the six still retain the two-tank system which was used last year.



Graceful bonnet and cowl on the new Lewis

Slight body changes in keeping with the tendency of the times make their appearance in this season's models. The curve of the fenders has been altered to follow the wheels more closely and the shallow boxes which formerly ran the length of the running boards have been eliminated. The rounded radiators which are a feature of the Sultanic and Majestic cars have been retained, but the flat type still appears on the Olympic for this year.

The general design of all three models is the same as far as the chassis are concerned. The motors are all L-head with the cylinders cast in pairs. The motor sizes are 4.125 by 4.75; 4.5 by 5.25 for the four cylinder models and for the six, 4.125 by 4.75. The motor design is conventional throughout. The crankshaft is carried on three bearings. The valves are of tungsten steel and are interchangeable. The electric system includes Auto-Lite starting and lighting units, and a Willard storage battery; the remainder of the starting and lighting units are manufactured by the Jackson company.

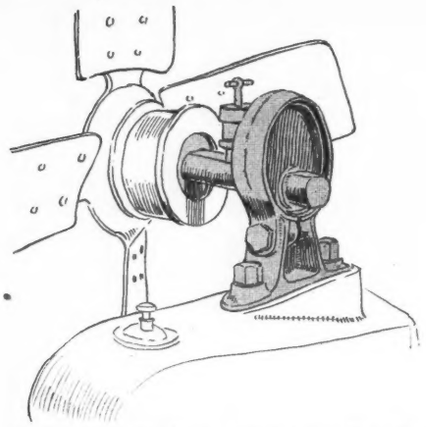
JEFFERY

Six chassis added to the line

ABANDONING its former policy of a single chassis model, the Thomas B. Jeffery Co., Kenosha, Wis., enters the six-cylinder ranks, although the new four is a car which will form the chief item of production, the six being merely an enlargement of the former to provide for those who wish Jeffery practice in a six-cylinder car.

The Jeffery four-cylinder car listed at $1,550 as a five-passenger touring car shows many features not generally associated with cars at such a low price. In general, the car has a block-cast 3.75 by 5.25 L-head motor, an inverted cone clutch with a clutch brake, a four-speed gearset with central control, splash pressure motor lubrication, pressure gasoline feed, floating rear axle, 34 by 4-inch tires, 116-inch wheelbase, left drive, patent detachable curtains, demountable rims, and a U. S. L. cranking and lighting system.

The Rayfield carbureter is attached by a single brass intake pipe, with one connection at the center of the cylinder casting. Timing gears have spiral teeth. Pressure feed of gasoline is employed with the fuel tank hung at the rear of the car. Cooling of the motor is through water circulation by a centrifugal pump and the radiator, while of the same construction as employed in the old Cross Country models, is a conventional shape. Ignition is the Bosch duplex system. Lubrication of the motor is by combination of force feed and splash system. Electric lighting



Marion fan adjustment. The fan pulley shaft is mounted eccentrically on the engine

and starting is supplied by the U. S. L. system, whose feature is the entire absence of gears in either the generating or cranking mechanism.

In combination with the flywheel is the cone clutch. On the clutch pedal shaft is mounted the clutch brake. Clutch and motor have three-point support, two arms form the rear end of the motor attaching directly to the side frame member while at the front a trunnion block is mounted on the upper side of the front frame member. Behind the clutch is a leather universal, one of the features of Jeffery design.

The battery portion of the duplex ignition system is a set of dry cells. These are hung in a special bracket underneath the cowl where they are protected from rain or dust. The brackets can be slipped out by a loosening of the nuts when a new set of battery is needed. The use of dry cells for the ignition separates the latter entirely from the lighting and cranking system.

Similar in almost every respect with the four-cylinder Jeffery is the six-cylinder. The motor has the same design of cylinders which are of the same dimensions, although they are arranged in pairs instead of in a single block.

The six-cylinder motor differs in the fact that the timing gears are chain-driven and the fan is an aluminum casting of which the pulley is a part. The Rayfield carbureter is water-jacketed on the six and also the brass intake manifold is water-jacketed.

KEETON

One model and French type hood

THE Keeton company adheres to its policy of manufacturing one chassis only, while in appearance its car still holds to the French type of hood with the dashboard radiator. The price remains the same as last season for the various types of body. Although building but one chassis model, several new body types have been added to complete the line.

The wheelbase of the chassis remains the same at 136 inches and the six-cylinder block casting of the motor has been retained. The motor develops 48 horsepower at 1,200 revolutions a minute. Throughout the chassis the general design remains the same as heretofore, although many refinements of details have been made strengthening and simplifying the construction as a whole. A power-driven tire pump has been added as standard equipment, a feature which will be appreciated by the motorist.

The Keeton for 1914 is the first car to carry a top slip roll which is an entirely new and convenient method of disposing of the oftentimes dirty and troublesome top boot when not in use. The cover is fastened to the large curtain at the rear of the top and rolls up compactly somewhat in the manner of an army blanket, the free portion fastening securely to the curtain with clasps when completely rolled. The head of the top trimming department of the Keeton factory devised this method of carrying the boot and has secured patents on it.

Last season the Keeton chassis was clothed with three body types—a seven-passenger touring car, roadster and coupe. But the 1914 line includes, besides these three a cabriolet roadster, following very closely Kellner's design for this very popular European type of body; a berlin limousine in which great attention has been paid to interior decoration and finish; and a five passenger phaeton type of body which is convertible into either an open or a closed car.

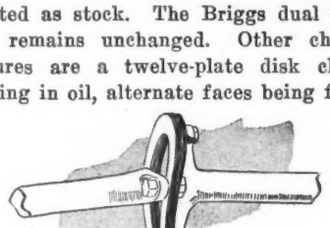
Electric cranking and lighting on the Keeton is continued as heretofore. Wire wheels are standard on all models with an extra detachable wheel carried over the gasoline tank at the rear of the frame. In all other respects the equipment matches up with present-day demands of the motoring public.

KING

Cantilever rear spring system used

THE four-cylinder King car is featured by a larger motor at a lower price by the King Motor Car Co., Detroit. Without electric lighting and starting it now sells for $1,090, a reduction of $410 under last year's price. With the Ward-Leonard electric starting and lighting system $100 is added.

The motor this year is 3.88 inches in bore as compared with 3.75 inches last year and the stroke remains the same, 5 inches. Thermo-syphon cooling is still used and a circulating splash oiling system. The four cylinders are cast in a block and for this season the Stromberg carbureter has been adopted as stock. The Briggs dual ignition remains unchanged. Other chassis features are a twelve-plate disk clutch running in oil, alternate faces being faced with asbestos material, a three-speed gearset carried as a unit with the motor, and a floating rear axle. Left drive and center control, featured last year on the King cars, are continued.

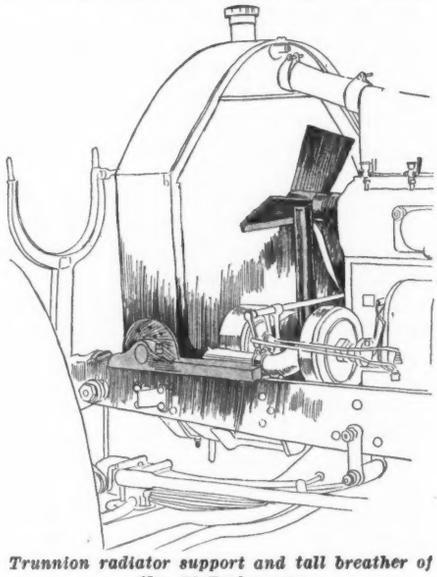


Marmon's flexible universal made of steel rings

The spring feature of the King, which has been a noteworthy adaptation of the cantilever rear system, is continued without change. This is a modification of the Lanchester type of rear springs, attached to the frame by means of a slotted bracket which permits freedom of movement in an endways direction, but does not permit of movement sideways. The wheelbase remains as before, 112 inches. One of the features of the car is the clean appearance, the running boards being free. The battery is now carried under the tonneau floor and the tool box is also out of sight. The touring body is a five-passenger type of modified streamlines having a cowl dash with the side lamps set flush. The fenders closely follow the curves of the wheels and a complete equipment is furnished with the car at the inclusive figure.

KISSELKAR

THREE current models, introduced last July, and two models, the details of which are not yet available, constitute the line of pleasure cars offered by the Kissel Motor Car Co., of Hartford, and Milwaukee, Wis. The current three consists of one four-cylinder chassis of 40 horsepower, with touring, runabout and sedan bodies, and two six-cylinder chassis of 48 and 60 horsepower, respectively, with touring, runabout, sedan, limousine and berlin bodies.



Trunnion radiator support and tall breather of the McFarlan six

Features which all three models possess in common include the following: Left drive and center control; electric lighting and starting; four-speed gearset with direct drive on third; cone leather-faced clutch with adjustable spring inserts; sliding gear selective type of transmission with F. & S. annular ball bearings; chrome vanadium steel gears; two foot

brakes, internal and external, contracting on rear wheel drums 14-inch diameter by 3-inch face; universal between clutch and transmission; Spicer joints on drive between transmission and differential; Mayo square-tube radiator with belt-driven fan; pressure fuel feed with gasoline tank and gauge in the rear; three-unit system of starting, lighting and ignition; water-cooling—positive circulation with centrifugal pump; taper roller wheel bearings.

The 4-40, which sells in the open body models for $1,850, has a bore of 4¼ inches and stroke of 5¼ inches, the motor being cast in pairs. The tires are 36 inches by 4 inches and the wheelbase 121 inches. The 6-48, which sells in the open body models for $2,350, has a bore of 3¾ inches and a stroke of 5½ inches, the motor being cast in block. The tires are 36 inches by 4½ inches and the wheelbase 132 inches. The 6-60, which sells in the open body models for $3,150, has a bore of 4¼ inches and a stroke of 5¼ inches, the motor being cast in pairs. The tires are 37 inches by 5 inches and the wheelbase 142 inches.

The equipment of the 4-40 includes tires, pantasote top, wind and rain-vision ventilating shield, shock absorbers, Stewart speedometer, electric horn, tire irons, robe and foot rails, horn, jack, pump and tools. Both six-cylinder models are equipped with the one-man top, manufactured under the Golde patent, and everything else in the way of modern equipment.

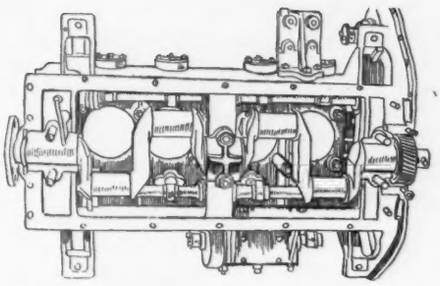
KLINEKAR

Four models, two sizes, two fours

THE Kline Motor Car Corp., Richmond, Va., is making four 1914 models known as the 6-60, 6-50, 4-40 and 4-30. The first numeral designates the number of cylinders and the latter combination the horsepower. The 6-60 motor is a six-cylinder rated at 60 horsepower having the cylinder castings in pairs and bolted in block. The shape of the cylinders is T-head and the bore is 4.31 inches with a stroke of 5.75 inches. The intake valve located on the left side of the motor and exhaust valve on the right. Both the intake and exhaust manifolds are cast separately. Both the motor and the transmission are suspended at three points, the latter having four forward speeds and being a separate unit. The clutch is in the flywheel and is of the cone type, leather-faced and with cork inserts.

The lubricating system is a combination, forcefeed and splash, the main bearings receiving their oil under pressure while the overflow is scooped up by the connecting rods forming the splash. A flat-tube cellular radiator is used in conjunction with a centrifugal pump to form the water-cooling system. The gasoline system is gravity feed from a tank under the front seat to the carbureter, being regulated from the side of the car.

Electric equipment consists of a Rushmore starting and lighting system—separate units—and a Bosch dual ignition



Cylinder base of Mercer, showing bearing arrangement and spiral timing drive

system. The double wire system is used in lighting and the voltage at which the system operates is six. The steering wheel is located on the left side and the gearshift and emergency brake levers in the center. The gear reduction is 3.7 to 1 on third speed or direct, while the fourth speed is geared above direct giving a ratio of 2.69 to 1. The drive is through a bevel gear rear axle of the floating type. The wheelbase is 133 inches, the tread 56 inches and 37 by 5-inch tires are used all around in connection with Firestone detachable demountable rims.

The other Kline motors are of the same type except the 4-30, the cylinders of the latter being cast separately, with inlet and exhaust manifold on the right side. The 4-30 is a 4 by 4.625, the 4-40 a 4.3 by 5.75, and the 6-50 a 4.125 by 5.5. All are lubricated by combination splash and pressure, have gravity-fed carbureters and Rushmore electric starting and lighting systems. Dual ignition is used on all but the 4-30 where two separate systems are employed. Other chassis details follow the description of the 6-60 above except that the 4-30 has right drive and right control, The wheelbase in the 4-30, 4-40 and 6-50 is 115 inches, 120 inches and 128 inches, respectively, and the line offers a selection from the following body types: Seven, five, four and two-passenger. The only closed car built is a two-passenger coupé roadster, which is turned out on the 4-40 chassis.

KNOX

Springfield concern has four chassis

FOUR chassis are offered by the Knox Automobile Co., Springfield, Mass., for 1914, two fours, models 44 and 45, and two sixes, models 46 and 66. Electric lighting and starting has been added to all models. The two four-cylinder cars are the same except for wheelbase, gear ratio, tire size and steering. The motor of four cylinders with 5-inch bore and 5.5-inch stroke has separately cast cylinders and the valves in the head—Knox construction for some years past. Bosch double ignition and Stromberg carbureter are used. The running gear details consist of a disk clutch, three-speed selective gearset, a unit with the motor, driving to a floating rear axle. The 44 has a gear ratio of 3.3 to 1 with 122 inch wheelbase and 36 by 4.5 inch tires. The model 45 has a 3.3 to 1-gear ratio, a 126-inch wheelbase and 37 by 5-inch tires. Right steer and center gearshift control are used on the model 44, whereas the steer is optional and the control center on the model 45.

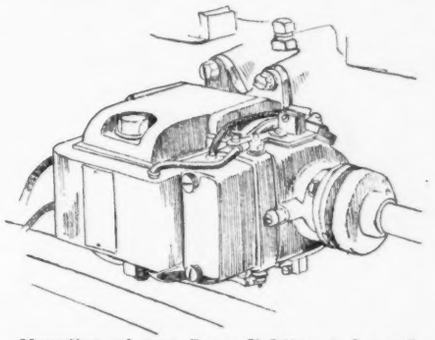
The two six-cylinder chassis are somewhat different. The model 46, unchanged for the coming season, has a bore and stroke of 4.38 by 5.5 respectively, with cylinders cast in pairs, the valves being in the head, Bosch double ignition and Scott carbureter are equipped as stock. The motor drive is through a disk clutch to a three-speed selective gearset, thence to a floating rear axle, the gear ratio being 3 to 1; the wheelbase 134 inches and the tires 38 by 5 all around. Optional steer and center control are offered.

The big six, model 66, has a bore of 5 and a stroke of 5.5 Bosch double ignition with Stromberg carbureter are seen on this model. The clutch, gearset, wheelbase and rear axle are the same as in the little six. The gear ratio, however, is 3 to 1 and the tires 38 by 5.5 inch all around. The steer is optional with center control. All Knox cars are equipped with the Berdon lighting and cranking system.

KRIT

Production limited to a four-cylinder

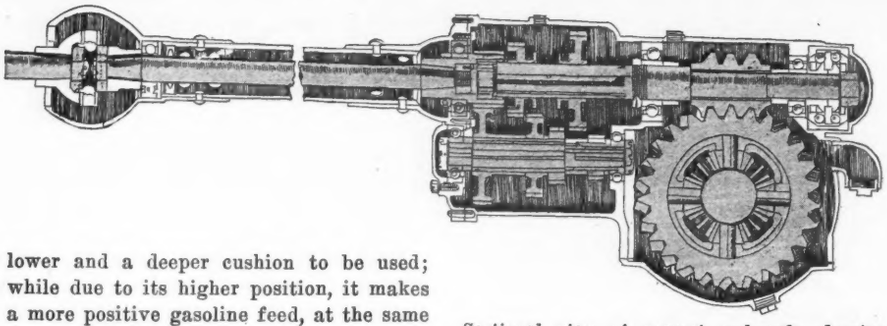
THE entire production of the Krit Motor Car Co., Detroit, is limited to a single four-cylinder chassis model on which two body types are fitted—a roadster and a touring car. This chassis is virtually the same as that of last year, but the bodies are new in design. They conform to the latest dictates of body fashions in that the ultra-streamline effect is carried out.



Mounting of new Remy lighting and cranking dynamo on Mitchell, bolted to side of crankcase.

A new shape of hood is also a part of the new outward appearance of the Krit, it being a sloping type with a rounded top to conform to the altered radiator design. A sloping cowl meets this sloping hood without break in the smooth lines, and carries back to the body proper. No side lights are fitted, the head lamps being so connected to the dash switches that either a dim or a bright glow may be had.

Along with this entirely new and refined body, the Krit this year is also fitted with a 10-gallon cowl gasoline tank to replace the former under-the-seat type. The reservoir has a 2-gallon reserve. This tank position allows the front seat to be set



Sectional view of gearset and axle showing the worm drive of the Lyons-Knight

lower and a deeper cushion to be used; while due to its higher position, it makes a more positive gasoline feed, at the same time permitting the carbureter to be more accessibly placed higher up.

Although the new body types are the talking points of the Krit cars this year, the power plant has come in for some refinement, principally to make a higher speed proposition along with a decrease in vibration. This has been accomplished by lessening the weight of the reciprocating parts. The maximum speed of the engine has been thus increased from 2,400 to 3,100 revolutions a minute. The greater weight has been clipped from the pistons, a total of 3.5 pounds being taken off of them.

The motor in general construction remains as in 1913. The cylinders are L-head, block-cast design with a bore of 3.69 inches and a stroke of 4 inches, giving about 25 horsepower normally. The gearset bolts to the back of the flywheel housing, making a three-point supported unit power plant; one frame support being at the front and two at the rear. Thermo-syphon cooling, splash lubrication, Bosch variable spark ignition are among the features. The latter variable ignition replaces the fixed spark type formerly used.

Although the price of the 1914 Krit is practically the same as last year at $950 with full equipment, for $100 additional a complete electric combination cranking and lighting system is supplied. When not equipped with this lighting system, the 100-ampere-hour Willard storage battery which is a part of the standard equipment furnishes current for the lights. Oil side and tail lights, gas headlights with Prest-O-Lite tank optional.

Chassis details include a torque tube inclosed propeller shaft with universal joint at the front end, semi-floating rear axle, underslung elliptic rear springs, left drive and control. None of these features is altered in the new cars. The wheelbase, however, has been lengthened by 2 inches to 108 inches.

LEWIS

Newcomer in six-cylinder form only

AMONG the latest of the newcomers to the motor car field is the new Lewis car made by the L. P. C. Motor Co., Racine, Wis. The car appears only as a six-passenger light six-cylinder car listing at $1,600. The motor is unique in that it is a block casting of unusually long stroke, the cylinder dimensions being 3½ inches bore and 6 inches stroke. The cylinders are of the L-head type with the camshaft driven by silent chain. Lubrication is of the pure splash type, the level maintained by the flywheel. A multiple-disk clutch together with the three-speed selective gearset form a unit with the motor. The rear axle is floating and left drive and center control are fitted. The wheelbase is 135 inches, the tires are 36 by 4. An electric lighting and cranking system forms a part of the equipment as do Jiffy curtains. Fifteen miles per gallon of gasoline is the fuel consumption claim.

LAMBERT

Smaller friction-driven model added

LAMBERT cars for the new year are featured by the appearance of a smaller and lighter model than any that has been marketed previously by the Buckeye Mfg. Co., Anderson, Ind. This is known as the model 42. The other chassis model is a continuation with some changes of the earlier product, and known as the model 60. All the cars in the new line are designated as series C. Naturally the chief feature of Lambert construction is its friction drive or, as the maker chooses to call it, the gearless transmission, giving any number of speeds. It consists of a friction wheel in contact with a friction disk on the engine shaft. The shaft of the friction disk drives the rear axle through a Renold silent chain which is inclosed in an oil-tight housing.

The model 60 series C car is the largest one and has rather an innovation in that instead of making the motor an arbitrary feature of the car the Buckeye company makes it optional equipment, that is, either the Continental four-cylinder 4⅛ by 5¼ motor may be used or the Rutenber four-cylinder 4¼ by 5¼. Such an option may be considered rather an added attraction to the purchaser in that it allows his personal whim to be gratified with reference to the engine.

As to the changes in the model 60, the body is made more roomy and luxurious, the fuel tank is carried under the cowl of the dash and all of the instruments placed on the cowl board and protected by an extended shroud. The windshield is of the ventilating type. The new car, which has been brought out for this season is the model 46 and like the larger one is equipped with either Continental or Rutenber motor, the cylinder dimensions being 3¾ by 5¼ inches. This car is left drive and center control and carries a locking feature on the emergency brake lever so that it can be locked on the street to prevent theft. The car has 112-inch wheelbase, 32 by 3½-inch tires and electric lighting and cranking outfit. It appears as a five-passenger touring car at a list price of $1,200. The car is built very low, much lower than the usual friction-driven car. The price of the larger model remains $1,395 with Disco electric lighting and cranking apparatus $200 additional.

LENOX

Two models, a four and six, listed

TWO models, a four and a six, make up the Lenox line as turned out by the Lenox Motor Car Co., Boston, Mass. Both models have their gearboxes mounted as a unit with the rear axle and the Gray & Davis lighting and starting system is used in connection with each.

The four-cylinder motor has a L-head cylinder casting in which all the cylinders are cast together in a single block. The bore of this motor is 4.25 inches and the stroke is 5.5 inches. The makers rating for this motor is 40 horsepower. The motor is water-cooled, this function being aided by a honeycomb type of radiator. Single magneto ignition is used, the current being furnished by an Eisemann high-tension instrument as it is figured that the electric cranking motor will spin the engine fast enough to obviate the necessity of a battery system for starting. A cone clutch faced with leather is housed within the flywheel and the rear-axle gearset provides a range of three forward speeds and a reverse. Left steering and center control is fitted, the emergency brake lever being to the right of the gearshift lever and controlling an internal brake having a drum diameter of 12 inches and a face width of 2.25 inches. The service brake is also internal and has a diameter of 16 inches and a face width of 2.5 inches. The wheelbase is 118 inches.

The six-cylinder car has a bore of 4 inches and a stroke of 5 inches. It is rated by the makers at 60 horsepower and has its cylinders cast in threes. The general features of this car, outside the motor and its greater size, do not vary much from the four-cylinder. The Eisemann single ignition is used and the Lenox carbureter and three-quarter floating axle. The wheelbase of the six is 130 inches.

LOCOMOBILE

Choice of right or left drive given

FOUR chassis make up the Locomobile company line. Two of them are left drive and two right drive. No four-cylinder models are made by the Locomobile Co. of America, Bridgeport, Conn., this year, all four chassis being sixes. The four chassis divide themselves naturally into pairs. Two have left drive and two right drive. They are known as the 38

left drive and 38 right drive, the 48 left drive and 48 right drive.

Few changes of a mechanical nature have been made in the car and what have been made are chiefly due to the new position of the steering wheel on the left side of the car. In both the 38 and 48 the wheelbase of the left-drive car is 4 inches longer than that of the right drive. On the left-drive cars the wheelbase for the 38 is 128 inches and for the 48 140 inches.

A novel scheme in the controlling mechanism for the Locomobile is the placing of the gearshift close against the front seat in the center of the car and the emergency brake on the left. An improved carbureter will be found on the 1914 Locomobile, the needle valve construction governing the admission of gasoline having been changed.

Another feature in connection with the carbureter is the mounting of an air control device directly under the steering wheel. The gasoline is fed to the carbureter on the left-drive models by pressure and on the right-drive models by gravity. The electric motor starter equipment which was introduced in 1913 has been continued without change. The trend toward improvement in body design which has been noted all over the country is exemplified in the Locomobile types which have been rendered distinctive by modified use of the streamline, and in a detailed way by using rivetless fenders, etc. Many conveniences will be found on the car in the line of up-to-date accessories which besides the usual equipment include exceptionally rigid tire carrier in the rear, a single-cylinder air pump which can inflaet a tire to 90 pounds in 2 minutes and rigid lamp and license bracket fastenings which make for silence.

LUVERNE

Six motor made larger; wheelbase decreased

THE Luverne Automobile Co., Luverne, Minn., is offering a six-cylinder thermo-syphon cooled car with a number of essential changes. The motor's dimensions have been increased from 3¾ by 5 inches to 4 by 5 inches and the wheelbase decreased from 130 to 128. The tires have been made smaller, due to the decrease in weight of the car.

The new Luverne will appear with 36 by 4½-inch tires all around against 37 by 5 in the previous model. A price reduction of $350 is to be noted, the new figure being $2,500. The Kellogg air starter is an addition to the equipment and the lighting is by Vesta generator, with the lamps so arranged that they may be used for both acetylene and electricity. The body design has been changed slightly allowing for a continuous leather row along the top edge of the body sides. The distinctive features of Luverne cars, such as double running boards, Spanish brown leather and brown finish, remain unchanged.

This year will see the big brown Luverne with left drive and center control as formerly, a disk clutch driving through a selective gearset to a floating axle. The double step feature of the Luverne not only adds to the appearance of the car, but affords a means of obtaining clean running boards. The upper step is hollow and is used as a tool box, the battery being placed under the floor boards and the extra tires at the rear.

The Luverne six motor remains unchanged in design, the cylinders being as before of L-head construction cast in pairs with all the valves on the left side. The camshaft is driven by helical gear, and lubrication is by splash with an auxiliary pump to supplant any deficiency. Ignition is by dual system and fuel feed by gravity, the tank being located under the front seat.

LOZIER

Concern making four besides six

THOUGH the Lozier Motor Co., Detroit had no four-cylinder cars on the market for the past year, concentrating its efforts on a big six-cylinder car and a light six, it has now discontinued the production of this larger six in order to give over its whole facilities and attention to producing a light six, a four-cylinder car which with marks the entry of the Lozier company into the medium price field and its return to the making of four-cylinder models. It is to sell for $2,100 with full equipment. The motor in particular is remarkably simple in outward appearance. Specially noteworthy in this respect is the left side, on which the carbureter is the only external fixture. The stroke of this engine is exceptionally long—6.5 inches, while the bore is 4.25 inches, giving a ratio of 1.53 and a piston displacement of 533.8 cubic inches.

The intake opening, being on the opposite side from the valves, the passages run between the cylinders within the casting to the valve side. The exhaust manifold, however, is external, having an opening into each cylinder. The pressure system of lubrication is employed with the flywheel acting as a centrifugal pump. Mechanical water circulation with centrifugal pump is used, while gasoline is fed by pressure from a tank at the rear of the chassis. The Gray & Davis lighting and cranking system is used, the motor and generator being separate. Mounted as they are on the right side of the gearcase, they drive through silent chains to the clutch shaft.

Lozier's one-man top in operation

The gearset affords four speeds forward, and the power goes to the rear through an unineclosed propeller shaft to the floating rear axle. The wheelbase is 120 inches, and besides the usual equipment, a power tire pump is furnished which is inbuilt into the motor, being on the magneto and pump shaft.

The Lozier light six has a motor 3.875 by 5.5 cylinders which are cast in threes and of the L-head type. The motor develops 62 horsepower, and any changes which have been made in it are in the nature of refinements tending towards greater silence.

Though the 1913 Lozier light six was 500 pounds lighter than any car the Lozier company had ever produced, the new series appears still lighter by 300 pounds. A big factor toward eliminating needless weight is the new Lozier feature of direct drive through the rear springs, the radius rods and strut rods have been done away with in favor of this more flexible type of construction.

The light six has a wheelbase of 127.5 inches, is equipped with a Gray & Davis electric lighting and cranking system of two units mounted on the right side of the motor and also has a power driven tire pump. Its rear axle is floating, the clutch is a multiple-disk type, the gearset gives three forward speeds and the rear spring suspension is of the platform type. Left drive and center control are also used on the Lozier.

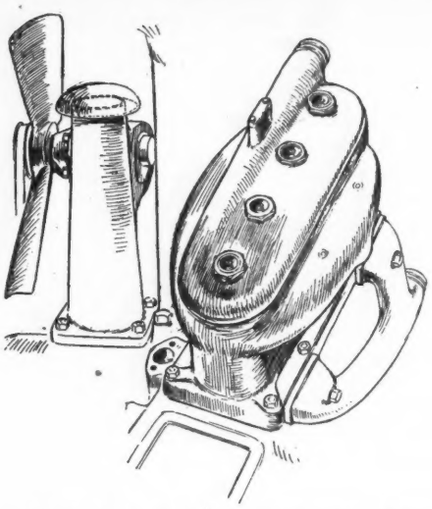
The equipment leaves nothing to be desired. Tires on the Lozier six-cylinder are 3.6 by 4.5.

LYONS-KNIGHT

Another advocate of sleeve-valve principles

HERETOFORE a builder of motor only, the Lyons-Atlas Co., which succeeded the Atlas Engine Works, of Indianapolis, has taken to car building, using, of course, the Knight motor for which it holds a manufacturing license. This new car carries the title of model K and appears in touring, sedan and berlin bodies and using only a four-cylinder motor, 4½ by 5½. Only one chassis is on the market at the present time, that carrying 138-inch wheelbase.

The Atlas-Knight motor differs from other Knights in that the sleeve travel has been increased, this idea being to improve the sealing of the ports and giving added increase in power. The walls of the sleeves have been made thicker than is customary but fillets made larger, and the lugs at the bottom made stronger. The inlet ports of the motor are arranged so that the shortest possible carbureter manifold is required, with a view to eliminating fuel condensation and also making the car-



Double lower water connection and combination breather and hand bracket on the Moline-Knight

bureter more accessible. With the idea of reducing back pressure in the cylinders, the exhaust manifold has been made 3 inches in diameter at the connection to the cylinder.

The oiling consists of a plunger pump, operated by one of the sleeve eccentric rods, which pumps oil from the reservoir underneath the crankcase to the different bearings of the motor. Before returning to the pump for recirculating, the oil is strained. Other features are double ignition, a double-jet carbureter, a three-plate clutch, and a floating axle. The Atlas pins its faith to left drive, center control, and also utilizes worm drive and a hydraulic shock absorber which is attached to the worm gear casing from the center of the rear frame member. The car is electrically started and lighted, the North East system being used.

Strong emphasis is placed on the equipment, which includes a one-man top, windshield, dust covers, accommodation speedometer and clock, tire holders, two demountable rims, trunk racks, etc.

MARATHON

Three models, Champion, Winner, Runner

THE MARATHON line is continued for 1914 by the Marathon Motor Works, Nashville, Tenn., in three models of much the same nature as the 1913 offering. These chassis sizes are styled models Champion, Winner and Runner, respectively, the corresponding horsepowers being 45, 35 and 25. However, the prices have been reduced, ranging now from $1,495 to $925, as compared to last year, when the Champion was listed at $1,750.

The motor sizes of the Champion are 4.5 by 5.125, of the Winner 4.25 by 4.5, and of the Runner 3.5 by 4.5. The motors are all L-head designs and unit, with the transmission and joint, including the multiple-disk clutches running in oil within the flywheel. Valves and valve rods are accessibly shut off from outside by removable plates. Three-speed gearsets with 4 to 1 ratios on direct are used throughout, and the two larger chassis have floating axles, while three-quarter floating axles are used on the Runner model. The wheelbases are 123, 118 and 106, respectively, and tire equipment is 36 by 4, 34 by 4 and 32 by 3.5.

MARMON

Model 41 is a new six-cylinder chassis

NORDYKE & Marmon productions for the new season are featured by the addition of a new six-cylinder chassis known as model 41, which, though hardly a light six, is considerably smaller than the former 6-48 which is continued by the Indianapolis concern. It comes midway in the point of size between that and the four cylinder Marmon 32, which likewise is retained as part of the line. The new Marmon 41's six cylinders are 4¼ by 5½ inches dimensions and are of the L-head type and are cast in two blocks of three each. The new axle is floating and the gearset is amidships.

There are a number of the refinements in the motor, the chief of which is the lubrication of the valve mechanism. As has been the rule in Marmon engines, pressure oiling is employed, the oil being fed to all the crankshaft and connecting rod bearings through holes in the crankshaft and likewise carried upward to the wrist pin by a tube brazed upon the connecting rod. In the new motor this arrangement is carried still further. The camshaft is inclosed in a separate chamber and runs submerged in oil. The valve tappets and adjusting screws are drilled out so that the oil can work to the point of contact with the valve stem, thus forming an oil cushion at this point. This effectually deadens the noise and materially reduces the wear.

The camshaft is driven by helical gears and the magneto and water pump are driven by silent chain from the forward end of the crankshaft, a double universal being provided for driving the magneto. A Noil tire pump is driven from the magneto universal. The motor is supported upon three points. The clutch is of the cone type and a form of plain release is used which gives a satisfactory braking on the clutch, dispensing with separate devices for this purpose. The gearset has three speeds and the drive from the latter to the rear axle is through universals and exposed shaft using a separate torque member for absorbing the driving and braking torque. The spring eyes are graphite bushings which are self lubricating and the springs themselves are self lubricating in that the leaves are formed with little pockets which carry graphite sufficient to lubricate the springs throughout their life. The electrical equipment consists of the North East cranking and lighting system. Bodies on the new 41 have a low streamline effect and the running boards are clean, the full length of the body top proper, though there is a large box just back of the fender on either side, one for tool equipment and one for luggage.

This new model appears as a roadster four-passenger and five-passenger touring and a limousine and a landaulet. Though the prices are not announced as yet they will fall somewhere between those of similar bodies on the two older models.

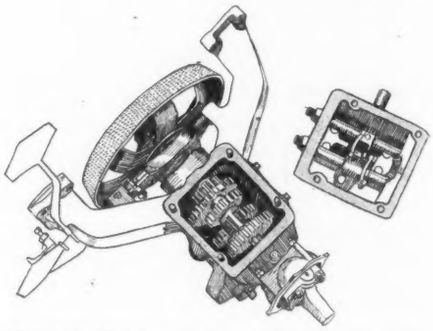
The two older models, the 4-32 and the 6-48 are continued with only detailed refinements. The 4-32 has a 4½ by 5-inch motor, has a cone clutch and a wheelbase of 120 inches, tires are 35 by 4½ inches in size. The bodies fitted to the four cylinder chassis include a roadster at $2,900, four and five-passenger touring at $3,000, a seven-passenger touring at $3,125, a seven-passenger limousine at $4,- and a three-passenger landaulet at $4,100.

The 6-48 has 4½ by 6-inch cylinders of the T-head type cast in pairs. The gearset is on the rear axle which is semi-floating. Wheels are 145 inches between centers and tires are 36 by 4½ inches in front and 37 by 5 in the rear. The bodies on the 6-48 include a three-passenger roadster and four, five and seven-passenger cars at $5,000 with a landaulet and a limousine at $6,350 and $6,450 respectively. The prices on both of those models are practically the same as those last year.

M'FARLAN

Six with left drive latest offering

ONE model, a six-cylinder, constitutes the line of the McFarlan Motor Car Co., Connersville, Ind. This company is using left drive, a 128-inch wheelbase instead of 124 inches, three-quarter elliptic springs instead of elliptic in the rear of the car, the radiator is now supported



Maxwell clutch member and gearset, showing arms connected to motor

on trunnions instead of plain bolts and several minor changes of a mechanical nature have been made. The Gray automatic gearshift is a feature.

The tank construction used in the 1914 product is better than last year in that seamless steel is used for the gasoline tank and the air tank for the starter is larger. An all-metal air pump has been added and the ball bearing steering knuckles have been eliminated.

The motor used in this car is a six-cylinder block type. The cylinders are T-head and have a bore of 4 inches and a stroke of 6 inches. The 2-inch crankshaft

is carried on four main bearings the lengths of which are 4.5 inches at the ends of the crankshafts and 1.875 inches in the center.

A decidedly compact appearance is given to the motor owing to its short overall length and the fact that the valves are inclosed by a plate which extends the entire length of the casting. Two other features worthy of note in the valve action is the width of the valve ports which are 2.25 inches in diameter and the length of the valve guides which measure 3.75 inches from top to bottom.

Ignition current is furnished by a Mea magneto and current for lighting is produced by a Deaco electric generator which stores a Vesta storage battery. The starting system used on this car is a pneumatic type of the same design as has been in use on McFarlan cars for the past 3 years. An improvement for this year in the starting system is the four-cylinder all-metal pump which can keep the 10 by 40-inch seamless steel tank filled to a pressure of from 250 to 300 pounds to the square inch.

MAXWELL

Three models, two fours and a six

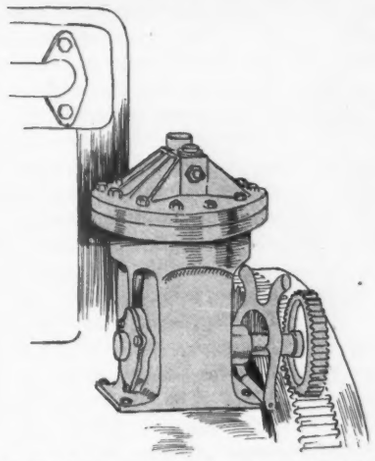
THE Maxwells are in three models—a 25 four-cylinder car; a 35 four-cylinder and a six-cylinder. Having gone through its reorganization period, the Maxwell Motor Co., Detroit, several months ago started in earnest to make these cars in large numbers, the greatest quantity production being that of the small four model 25.

This model 25 has a block-cast motor with the upper half of the crankcase cast integral. The size is 3.625 by 4.5. This engine has a detachable cylinder head which carries the spark plugs, priming cocks and water outlet connection. Ignition is by means of a Simms magneto which can be locked from the dash, lubrication is by the splash system with a positive oil pump and cooling employs a thermo-syphon system with tubular radiator.

The gearset bolts to the rear of the crankcase and is of three-speed selective type. The clutch is of the cone variety lined with a friction material. The springs are half-elliptic front and rear, the latter being attached to spring horns at their rear ends. The rear axle is three-quarter floating and gets its power through an inclosed drive shaft which has a universal joint at its front end.

The wheelbase of the 25 is 103 inches; it has left steer and center control; carries 30 by 3.5-inch tires and weighs 1,650 pounds.

Like the 25, the model 35 motor is a block casting with the upper half of the crankcase integral with the cylinders. It is a 4 by 4.75 with valves all on the left. But unlike the smaller motor, this one does not embody the unit power plant feature, the gearbox being back in unit with the rear axle instead. The flywheel



Engine-driven tire pump operated by Moon flywheel

is uninclosed and has teeth cut in its periphery with which the electric motor gear engages for cranking purposes, the car being equipped with electric cranking and lighting as a standard feature. Both intake and exhaust manifolds on this engine are cast integrally making a very smooth outward appearance to the assembly. The crankshaft has three main bearings; Splitdorf dual ignition is used; lubrication is by splash and cooling is mechanically provided for by the use of a centrifugal pump. The Holley carbureter gets its fuel by gravity.

The car has left drive and center control. The torsion tube inclosing the propellor shaft has a hinged yoke at its front end, and here also is the universal joint. Between the tube and the axle housing, the three-speed gear is mounted compactly, while radius rods run from the front of the torsion tube to the ends of the rear axle. Three-quarter elliptic rear springs are used and brakes are conventional. The wheelbase of this model 35 is 111 inches, and the car is fitted with 33 by 4-inch tires. The car weighs 2,750 pounds, and comes in roadster design besides the five-passenger touring.

The big car of the Maxwell line—the 50-6—has much in common with the model 35 so far as mechanical design is concerned. The motor is cast with cylinders in a block, the dimensions being 4.125 by 4¾. This car is being brought out with optional right or left hand drive. In the left hand driven car the valves are on the right side, while in the right hand driven car the valves are on the left side. Exhaust manifold is cast integral with the cylinder block. The wheelbase of the 50-6 is 130 inches, the tires are 36 by 4½ inches.

MERCER

Two new four-cylinder models added

Two new four-cylinder models have been added by the Mercer Automobile Co., Trenton, N. J. One is a five-passenger touring car mounted on a 124-inch chassis, and the other a large runabout mounted on a 118-inch chassis. These are known as models M and O, respectively. The small model K runabout has been discontinued, the larger runabout taking its place. The model J raceabout which has been a well-known Mercer type since 1910 has been continued, and model H a close-coupled five-passenger touring car will also be continued. The motor remains unchanged, the raceabout being fitted with a 4.375 by 5-inch engine and the other models having a 4.5 by 5-inch. The S. A. E. ratings of these two motors are respectively 30.6 and 32.4, although the makers require that each should show a dynamometer pull of 58 horsepower at 1,700 revolutions per minute. This high horsepower has been secured by using cams of exceptionally steep contour, and by valve diameters of 2.25 inches. The valve lift is 7-16 inch. The motors have T-head cylinders with the intake on the right and exhaust on the left.

The pistons have but two rings and H-section connecting rods are used with the H turned in the opposite direction from that generally employed. The crankshaft is carried on three large plain bearings, the lengths being respectively from front to rear 3.5, 3 and 4 inches. The diameter of the crankshaft is 2 inches. Rushmore lighting and cranking is employed and the ignition current is furnished by a two-point Bosch magneto with two sets of plugs firing simultaneously. The raceabout model has no electric lighting and starting system but carries an acetylene tank instead.

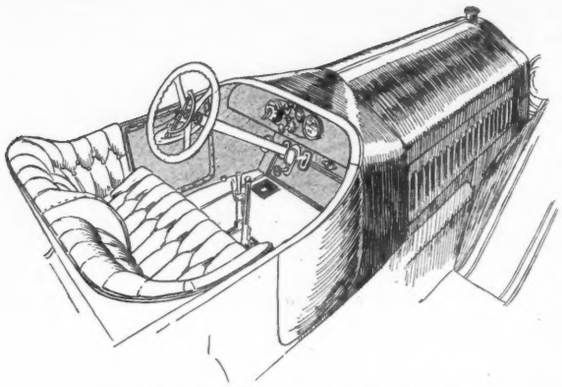
MARION

Company converted to the six

THE 1914 season marks the conversion of the Marion Motor Car Co., Indianapolis, to the six-cylinder field. Although the six has been marketed since August of last year it is a 1914 production. The four-cylinder model is also continued. The new car is known as the Marion G and comes in five body types fitted to the same chassis. These are a five-passenger touring car, two-passenger foredoor roadster and Bobcat speedster as well as a four-passenger coupe and a five-passenger sedan.

Another innovation for the Marion company is adoption of the left drive in connection with the center control. The latter has been a Marion feature for some time. The clutch of the six also marks a departure from former Marion practice in that the earlier clutches were of the cone type. The present one is of multiple-disk design with raybestos and steel facings.

The six-cylinder is the Continental L-head type with cylinders cast in threes. They have a bore of 3.75 and a stroke of 5. Elimination of the conventional breather pipe is provided by allowing the crankcase compression to escape through openings into the valve mechanism pocket in the cylinder castings. Breather holes in the valve cover plates relieve pressure



Boat-shaped lines of new National body

in these pockets. Among the features of the ignition system is the use of a special type of adjustable coupling in the shaft between the magneto and the driving wheel. This is arranged so that the spark timing may be altered through a range of 2 degrees without having to reset the gears.

Gasoline is fed to the carbureter by pressure by a small pump operated from the camshaft. Electric cranking and lighting equipment is by the Westinghouse system. A novelty in the way of horn mounting is found in the Marion six in which the electric horn is carried on a special bracket attached to the steering column and under the hood.

Two changes in the four are worthy of note. They are a larger cone clutch and a floating axle of the flange type. Four body types are fitted to the four; a five-passenger touring car, two-passenger roadster, Bobcat speedster and a four-passenger coupé.

METZ

Slight price reduction and few changes

WITH a price reduction of $20 over the 1913 figure the friction-driven Metz 22, offered by the Metz Co., Waltham, Mass., at $475 for 1914, appears with only slight changes mechanically, the efforts of the manufacturer being centered about body style. In contrast to former practice, this car now appears with the torpedo rear end or with the rear end which will accommodate a rumble seat. The four cylinders, 3¾ by 4 inches, are cast in block and with splash lubrication, single ignition and gravity fuel feed, constitute the power plant. The friction-drive, long a feature of Metz car, is retained, the final drive from the jackshaft to the rear wheels being by chain. The wheelbase is 90 inches, tires 30 by 3 and the drive left and control center.

MASON

Long-stroke four is offered

ONE regular model and two others which will be built on order constitute the line of the Mason Motor Co., Waterloo, Ia., for this year. The regular model is a four-cylinder having a 3.875 by 5 Duesenberg motor included in a 116-inch chassis upon which is mounted a steel-covered touring body. On special order the speedster type of body will be made and also by special request the two-cylinder design, a hold-over product will be made up.

Typical of the Mason power plant are the block cylinders, a two-bearing crankshaft, valves placed horizontally in the head, thermo-syphon cooling and Splitdorf dual ignition. Starting and lighting by electricity is not regularly included but if the purchaser desires he can have it for $200. The system generally fitted at the added price by the Mason company is the Jesco.

The chassis running gear includes a multiple-disk clutch, three-speed sliding selective gearset, Timken front and rear axles and emergency and service brakes on the rear wheel drums. The car is sold at an inclusive figure. If electric lights are not purchased an acetylene tank is furnished.

MITCHELL

Three chassis, two sixes and a four

THREE chassis, two sixes and a four, make up the Mitchell line. A number of detail changes have been made by the Mitchell-Lewis Motor Co., Racine, Wis., this year, although the distinctive features of Mitchell design have been maintained. The same three chassis as last year will be continued, but a modification of the European design used last year has been made to render the cars more suitable to American practice and American roads. The 4.25 by 7-inch four-cylinder car carries a two, four and five-passenger body. The little six with its 4.25 by 6-inch motor has a wheelbase of 132 inches and carries the same bodies as the four. The big six with its 4.25 by 7-inch motor and 144 inch wheelbase carries a seven-passenger body only.

The general features of all these chassis are alike, the motors are of the same design, having T-head cylinders cast in pairs. Power plants are carried on a subframe and are supported at three points. The design includes a cone clutch, a very strong frame, braced by three wide cross-members near its center, a massive ball thrust mounting at the front end of the torsion tube, a floating rear axle and seven-eighths elliptic spring. Left drive and center control are given.

Although this design is similar in all respects to last year the following changes as regards detail are included: The valve chambers are shallower, so that they are now closed by curve instead of by flat steel cover plates. The push-rod adjustments are more accessible and the construction throughout the motor has been lightened to the extent of 200 pounds, while not detracting from its strength. The six-cylinder is now supported by six arms which are cast as part of the crankcase and rest upon a U-shaped channel subframe. The valves are all interchangeable and in general, owing to the improvements, the motor is faster and more powerful than last year. The timing gear case has been redesigned completely and the gears are now cut with helical teeth. Eccentric bearings on the camshaft, generator shaft and magneto shaft provide for wear between the gears. An endless canvas belt supplants the gears for fan drive.

Remy cranking and lighting is used, the cranking motor being geared to the engine at a ratio of 25 to 1. The cone clutch is now a steel stamping in place of the previous aluminum casting. The gearshafts are now squared instead of splined, and the members of the frame which support the gearbox are curved upward instead of downward, allowing the whole gearbox to be dropped without removing the body.

METEOR

Shelbyville car one of newcomers

AMONG the cars which make their first appearance on the American market is the Meteor, built by the Meteor Motor Car Co., Shelbyville, Ind. It is marketed regularly as a five-passenger touring car in three different sizes. These three sizes are known as M-36, F-40 and the W-6-45. The two smaller ones have the same motor, a four-cylinder Beaver engine of 4 inches bore and 5 inches stroke. This motor has the valves on one side with the cylinders cast in pairs. A combination of splash pressure oiling is provided by gear pump. The chassis of the two are alike in every respect except that of wheelbase which in the case of the M-36 is 116 inches and on the F-40 is 118 inches. There is a slight difference in the ignition, the smaller one using the Remy magneto, while the larger one uses an Atwater Kent distributor.

The chassis layout of the two four-cylinder cars involves a multiple-disk clutch and three-speed gearset in unit with the motor, a three-quarter floating rear axle, 34 by 3½ inch tires and center control with right drive. Jesco electric lighting and starting system is installed at an extra cost of $125 on the M-36, while it is stock equipment on the F-40. An electric horn is stock equipment on both models. The M-36 lists at $950 and the F-40 at $1,275.

The six-cylinder car likewise has a Beaver motor 3¾ by 5 inches cylinder dimensions. In other respects the car is the same as the 40-horsepower creation except for wheelbase and tire size, the former being 122 inches and the tires 34 by 4. It lists at $1,600.

METROPOL

Car of 90 horsepower at low price

THE Metropol is a new car made by the Metropol Motors Corp., Port Jefferson, N. Y. It is interesting because it is the only 90-horsepower car selling below $1,500, and because the construction of its chassis is such that several parts are eliminated. The motor has an exceptionally long stroke, the bore being 4.25

and the stroke 7.875 inches. The S. A. E. rating of this motor is 29 horsepower, but the makers state that the actual horsepower developed is in excess of 90. The chassis is distinguished by the fact that it is a unit construction as far back as the rear end of the gearset which is mounted amidships. The crankcase flange has been extended until it forms a broad shelf which is rigidly connected to the side frame members. The gearbox is also solidly connected to the side frame and abutts at the rear against a solid bulkhead There is no universal joint between the clutch and the gearset and the solid construction up to this point does away with the universal joint at the rear end of the driveshaft. A three-speed gearset giving a ratio of 2.5 to 1 on direct is furnished and semi-elliptic springs are used both front and rear.

MOLINE

Knight motor adopted for 1914

MOLINE has cast its lot with the sleeve-valve motor and now the Moline Automobile Co., Moline, Ill., produces cars equipped with the Knight motor. But one model is offered, a combination touring car which provides facilities for five or seven passengers. The car is particularly noticeable for the fact that it is the lowest priced vehicle which has so far been put out with the Knight motor. It sells for $2,400.

The power plant is ample in size, being a 4 by 6 motor. It is the only American Knight motor which has all its cylinders cast in one block and is throughout a unique design; tubular connecting rods are an instance. Besides this distinguishing feature it is the only Knight motor which has yet been built with thermo-syphon cooling.

Coincidently with the adoption of the Knight motor the name Dreadnought has been discarded and in the place of the old name plate a figure of Sir Galahad appears. The bodies are of European cast, appearing in streamline form with an unbroken line from the front of the car to the rear.

A specially designed Wagner electric lighting and starting system having the cranking motor and the generator in separate units is fitted and the generator is driven by silent chain.

Outside of the addition of the Knight motor the Moline chassis remains without change of note. The elliptic rear springs have been abandoned at the rear for underslung semi-elliptics, floating axle is retained and the brakes are on the rear wheels. The fuel tank has been removed from the cowl to the rear of the chassis.

MONARCH

Sloping hood characteristic feature

THE Monarch Motor Car Co., Detroit, Mich., which was formed in Detroit last summer, is making for this year a four-cylinder touring car which departs from the conventional in having a sloping hood under which the radiator is placed. Though in front of the motor, this cooling device is concealed, its filler cap only protruding through the bonnet. This sloping hood together with the streamline body design makes a very distinctive-looking whole.

In accord with many other manufacturers, the Monarch concern enters its car in the lists with a cowl gasoline tank, allowing the carbureter to be placed higher on the motor and thus shortening up the intake pipe with the advantage of reducing condensation.

The motor is designed to give 25 horsepower with dimensions of 3.75 by 4.25 inches. The cylinders are cast in pairs. Cooling is by thermo-syphon, while combination force feed and splash lubrication is employed, the circulation of the lubricant being maintained by a cam-operated pump.

Motor and gearset are in unit. A multiple-disk clutch is used and from it the power goes to the three-speed gearset. A propeller shaft is the intermediary between power plant and rear axle. This propeller shaft is fitted with a universal joint at either end. The rear axle is semi-floating and its alignment is maintained by radius rods near either end. The rear springs are elliptic and underslung from the axle.

Left drive and center control are featured, and in general the design adheres to latest American practice. The wheelbase is 110 inches.

MOON

Six new in St. Louis company's line

TWO chassis will be offered by the Moon Motor Car Co., St. Louis, for 1914, a four and a six. The former known as the 4-42, and the latter as the 6-50. The six is entirely new and the four a carried over motor with numerous changes. The four-cylinder 39 and the six-cylinder 65 of 1913 have been discontinued. The new six has 129-inch wheelbase and has a very pleasing appearance with its sloping hood and flush-sided body. A Continental motor of 3.75 by 5.25 inches is used on the six. Cranking, lighting and ignition is by the Delco system. The drive from the motor is through a disk-clutch to a four-speed selective gearset and thence to a floating rear axle. The cowl dash is another feature of 1914 Moons, all the instruments being within arm's reach of the driver. Six body designs are offered, the five-passenger touring being listed at $2,150. All cars have clean running boards, obtained by placing the battery behind the apron, and the tools under the front seat.

On the four the Delco system is now fitted. The exhaust is now on the right side and the intake on the left, which is opposite from 1913. The water pump has been changed from the left to the right side.

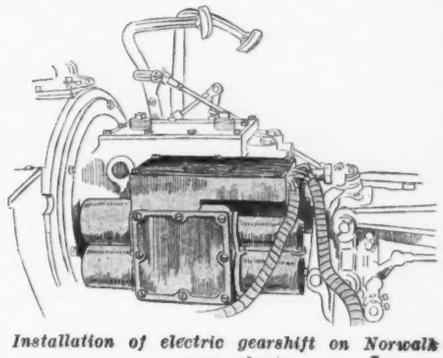
An auxiliary fan is used for 1914. The previous models used only the flywheel fan. The wheelbase has been shortened from 121 inches to 118 inches, and the H plate of the three-speed gearset changed so that the shifting is now done differently than in 1913. All wheels are now equipped with roller bearings, imported ball being featured last year. The absence of dash lights on all but the five-passenger is featured. The headlights are equipped with an extra small bulb, which is to be used for city work.

MOYER

New six-cylinder model leader

A NEW six-cylinder car is the leader of the present Moyer line, made by H. A. Moyer, Syracuse, N. Y. There are no radical changes in the general construction of this car over the 1913 design except that a new front axle has been incorporated. This has been designed to secure good steering qualities, the axle being made to give the steering knuckles an angle so that a straight line through the center of the king bolt will strike the ground at the point of tangency of the tire with the ground in about the center of the tire. This produces a castor effect and secures a balance for the front wheels that keeps them in a straight line with the car and gives the driver perfect control with practically no effort. It renders the transmission of road shocks to the steering wheel impossible and lessens the wear on the connections. In reconstructing this steering gear the king bolts have been made with 3.5 per cent. nickel steel, hardened, ground and lapped. They are 7-8-inch in diameter and there is a hardened 3.5 per cent. nickel steel bushing in the top and bottom portions of the axle forks and thrust ball bearing in the top of the knuckle. The six-cylinder model, which is new for this season, is a seven-passenger touring car equipped with a Moyer 4.5 by 5-inch T-head motor suspended at three points in the chassis. It incorporates the axle and a three-speed selective gearbox. U. S. L. electric starting and lighting systems, has a cone clutch, and floating axle. The brakes are both internal expanding acting on separate drums and the car has right drive and control. Fully equipped it weighs 3,500 pounds, without water or gasoline. The wheelbase is 135 inches, and the tires 35 by 4.5 inches.

The four-cylinder model, which has been continued over, is a five-passenger touring car equipped with a Moyer 4.5 by 5-inch



Installation of electric gearshift on Norwalk power plant

T-head motor embodying the three-point suspension feature and a U. S. L. electric starting and lighting system. This car has 120-inch wheelbase, 34 by 4-inch tires, cone clutch, floating rear axle, right drive and control, three-speed gearbox and weighs completely equipped 3,100 pounds without water or gasoline.

MORSE

Three-year guarantee a novelty

PRICE reduction is the main talking point of the new Morse made by the Morse Motor Car Co., Brookline, Mass., the list having been dropped from $4,200 to $3,600, while a novelty is a 3-year guarantee, coupled with an agreement to have a company inspector examine the car at least once in 90 days, and to give each car a thorough overhauling once a year. During the time the owner's car is in the shops the company will loan a machine for use while the overhauling is being done. Mechanically, the Morse remains a four-cylinder production with 4.625 by 5-inch cylinders of the T-head type. The Gray & Davis lighting and starting system is employed.

NATIONAL

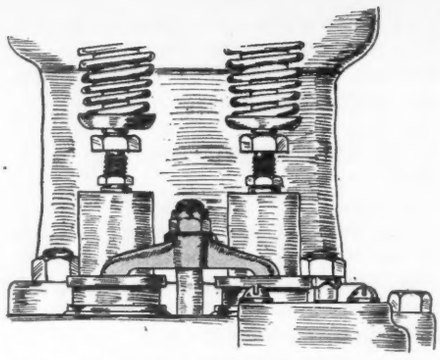
New six at popular price added

A SIX-CYLINDER car at less than $2,500 features the program of the National Motor Vehicle Co.'s factory in Indianapolis. This is the popular light six type, with a 3¾-inch bore and 5½-inch stroke. This has L-head cylinders cast in block. Model 40, the sole chassis model which has carried the National flag for the past year and the one which probably will be the chief factor in the company's production program for the future, has T-head cylinders, cast in pairs.

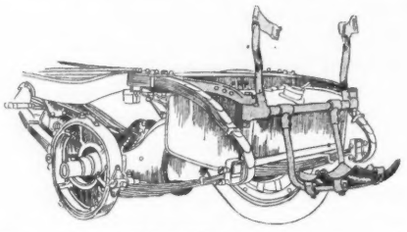
Not only in its entry to the six-cylinder ranks does the new car prove an innovation for the National; it is remarkable also for the exceptional sweep and cleanness of its body lines. Probably the body on this new six approaches as nearly to the so-called streamlines type as any so far entered on the American market. The hood tapers from the radiator back without a break; the taper seemingly beginning as far back as the front seat. As radical as the adoption of the sextuple engine is the cantilever type of rear spring suspension which is employed.

The motor, whose cylinder bore gives it a rating of 33.75 horsepower, transmits its power through a cone clutch with a three-speed gearset located amidships of the frame. An uninclosed propeller shaft with a universal at either end carries the power to the floating axle and a large torque arm takes up the twisting action. The car is 132 inches between wheel centers and tires are 36 by 4½ inches. The steering wheel is located on the left side, while the control levers are in the center and placed well back toward the seat, where they are least in the way.

The radiator has been improved in efficiency so that it can be made slightly smaller, and thus assist in obtaining the smart slope to the hood.



Valve tappet guide holders of the Overland



Rear end of Oldsmobile, showing spare tire carrier

The gasoline tank is set flush with the top of the frame, so that it becomes almost a unit with the body, while it is carried upon a more stable portion of the chassis. The mud-guards are exceptionally wide and are perfectly smooth and flat, having neither beading nor doming. The speedometer is driven from the propeller shaft universal. The bodies fitted upon the new six-cylinder chassis include a four-passenger and a five-passenger touring, and a three-passenger coupe. The touring cars listed at $2,375, and the coupe at $2,850.

The older National 40, a four-cylinder car of 4⅞ by 6 inches bore and stroke is continued with little change. The motor is T-head cast in pairs. The chassis differs from that just described in its electric equipment which is Gray & Davis, in the wheelbase, which is 120 and 128 inches for different bodies, and in the rear springs which are three-quarter elliptic. Prices remain nearly the same on the 40. There are roadsters at $2,750 and $3,150, four and five passenger touring at $3,300, a seven-passenger tourist at $3,400 and inclosed bodies.

NORWALK

Electric gearshift a talking point

THE Norwalk Motor Car Co., Martinsburg, W. Va., is putting two sixes on the market, each equipped with four types of body and one rated at 48 horsepower and the other at 54. Both have the electric gearshift. The larger chassis, known as model C, has a motor bore of 4 inches and a stroke of 5.5 inches, with the cylinders cast in threes. T-head castings are used with the intake valves on the left side and the exhaust valves on the right side. The valves are operated by a camshaft driven by spiral gear. The motor is supported at three points and carries a gearset in a unit with it. This model is distinguished from the other Norwalk model by the fact that both springs are overslung, while the frame is underslung. The weight of this chassis is 2,700 pounds.

Model D Norwalk chassis, the smaller of the two sixes, is also provided with a unit power plant suspended at three points. Left steering is used on this, as on the larger model. The cylinders of this model are cast in blocks of three and are of T-head shape with a bore of 3.75 inches and a stroke of 5 inches. The general design of the motor follows the larger model and the electric equipment, which consists of a Westinghouse starting system and an Atwater Kent ignition system, is the same on both models. A set of dry cells is carried for emergency. The bodies furnished with these cars are a two-passenger roadster, four and six-passenger touring cars and a limousine with a seating capacity of six persons.

OAKLAND

Output includes fours and sixes

THE Oakland manufacturing policy for this year is one which aims to meet the requirements of every class of buyer by including in the Oakland Motor Car Co.'s output both fours and six-cylinder machines. A new light six features the line, made at Pontiac, Mich., while two four-cylinder types which are practically continuous of the same models of last year are offered.

The distinctive V-shaped radiator which distinguished the cars last year is continued on all models for 1914, while the noncontinuous running board construction used last year has been replaced by continuous cast aluminum running boards.

Prices for these Oaklands are quoted with full equipment, which is the first time the fixtures have not been listed extra. Besides the regular array of equipment, Delco combination electric cranking, lighting and ignition is included. Thus the cars are really cheaper than last year. Model 48, the light six, lists at $1,785; while model 43, the larger of the two fours, is sold for the same amount. Its price last year was $1,750 without equipment. Model 35, the smaller four, for which $1,075 was asked in 1913 without equipment, sells for $1,200 now ready for the road.

Although right drive and control were used on all Oaklands last year, models 48 and 35 have center control and left drive for 1914; model 43 only retaining the right drive and control.

The light six has a 3.5 by 5 motor, the cylinders being block cast and integral with the upper half of the crankcase. The valves are all on the left and enclosed. The gearbox bolts to the rear of the flywheel housing making a unit power plant which is suspended from the frame at three points. The crankshaft has four plain bearings, and this as well as the

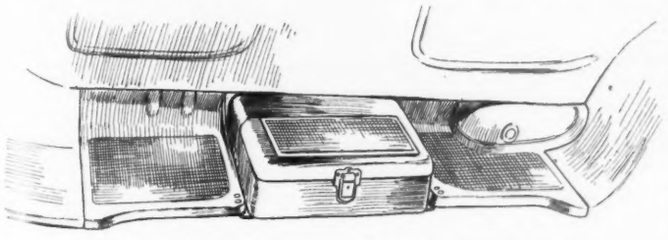
other reciprocating parts are made as light as possible without sacrificing strength. Vibration is reduced to a minimum in this way. A special feature of the motor is the double exhaust maifold, one arm of which takes the burned gases from each three cylinders. This prevents burned gases from one cylinder entering another due to exhaust openings overlapping.

Chassis details include a three-speed gearset, cone clutch, uninclosed drive shaft parallel by a torsion arm, semi-floating rear axle, underslung three-quarter elliptic rear springs, and gasoline tank at the rear feeding by pressure. The touring body of this new six is of the latest streamline type, having a round-topped hood and radiator to conform. The cowl slopes down to the hood with unbroken line, most pleasing to the eye.

Model 35, the smaller four has a motor of the same cylinder dimensions and general design characteristics as that of the little six just mentioned. With a unit power plant, having block cast cylinders in unit with the crankcase, L-head type with valves on the left, and reciprocating parts of the same dimensions wherever practicable, this four-cylinder engine remains unchanged over last year. Back of the motor, the cone clutch conveys the power to the three-speed gearset and this in turn sends it through a propeller shaft enclosed in a torque tube back to a semi-floating rear axle. The gasoline tank is at the rear of the chassis. All of these features are unchanged for this year in the Oakland line.

The motor of model 43, the larger four-cylinder car of the line, has been increased in bore and stroke. Formerly it was a 4.125 by 4.75-inch engine, while in the new series it has dimensions of 4.25 by 5.25 inches, giving an increase of power of last year. In the general design, however, the previous features hold. The cylinders are L-head, cast in pairs and bolting to the aluminum crankcase which is split horizontally in the usual way. The gearbox bolts to the rear of the crankcase, giving a three-point supported unit power plant and in all other respects, the same engine design as that used on the two models mentioned above is adhered to.

A cone clutch, three-speed gearset, unenclosed driveshaft, floating rear axle, underslung rear springs and pressure feed gasoline system with rear gasoline tank are among the specifications of the model 43 chassis which have come in for no change.



Oakland running board carries tool box as part of step

Save for the change in running board construction, this car has the same outward appearance as last year.

OVERLAND

Only one chassis for this year

STANDARDIZATION at the factory of the Willys-Overland Co., Toledo, O., has dictated a policy for this year which means the production of one chassis model only. The 1914 chassis is known as model 79 and is a continuation of the 1913 model 69 with several changes. A slight reduction in price of model 79, as compared with that asked for 69, is also a point of interest. Greater production and parts standardization makes it possible to shave the figure to $950. Model 71, the larger of the two 1913 chassis, has been dropped.

None of the Overland characteristics of mechanical design has been changed, those alterations which do appear being essentially detail refinements. The four cylinder, L-head motor, with its singly-cast cylinders, the mounting of the three-speed gearset in unit with the rear axle, the carrying of the drive shaft within a torque tube, the three-quarter floating rear axle, and the right drive are features which remain as they were.

Although the cylinder bore has been increased from 4 to 4.125 inches, the stroke remains at 4.5 inches. The valves are on the left and a new type of valve plungers is used. They have a yoke which bolts at its center to the crankcase and clamps each set of two plungers for each cylinder. Although pressed steel now replaces aluminum for the lower half of the crankcase, no change in the shape of this is noticeable. Five plain bearings carry the crankshaft rigidly.

The Gray & Davis two-unit cranking and lighting system by electricity is fitted to this new Overland motor at an additional cost of $125. The motor and generator are mounted on the left front side of the motor and are driven off the end of the crankshaft by silent chains. The Overland now has a new type of ignition which is independent of any other electric apparatus which may be fitted. It is of the Splitdorf dual type, the magneto placed on the engine's right side.

The flywheel and leather-faced cone clutch are uninclosed, and back of them is the yoke carrying the front of the torsion tube. In accord with the practice where a torsion tube is used, a single universal joint is fitted to the front end of the drive shaft. The gearbox at the rear axle bolts through flanges to the axle housing and the tube.

On this new Overland the wheelbase has been lengthened from 110 to 114 inches, and this results in a longer, more rangy body, both in appearance and actual room for the passengers. The increase is given to the body almost entirely, as the hood has been lengthened only ¾-inch over that of model 69. The clear running board and smooth sided effects are very pronounced, while fenders are crowned and rivetless. Besides the touring design, the Overlands of 1914 are in roadster and coupe types as well.

OLDSMOBILE

Two wheelbases offered on six

FOR 1914 two wheelbase lengths in a single six-cylinder chassis are offered by the Olds Motor Works, Lansing, Mich. The new car appears in seven-passenger form with a 139-inch wheelbase and in four and five-passenger form with a 132-inch wheelbase. Last year but one chassis was offered with a 135-inch wheelbase.

Price reductions are to be noted as follows. The seven-passenger is listed at $3,150 and the four and five-passenger at $2,975, last year's prices being $3,350 for the seven and $3,200 for the four and five.

The motor has been made larger, the bore and stroke now being 4.25 by 5.25 inches, while the 1913 model had a motor of 4.125 by 4.75 inches. The intake manifold, water pipe, fan and wire conduit are now to be seen white enameled and the exhaust pipe of shiny black rust-proof material. The drive from the motor is still by cone clutch to a three-speed gearset and then to a floating rear axle. The rear springs have been lengthened slightly and are now underslung. Tires are 36 by 5 inches all around, while the 1913 model had 36 by 4½ in front and 37 by 5 in the rear. Changes have been made in the matter of equipment and body. The only addition is the Taylor Noil tire pump, but a new type of Jiffy curtains has been adopted. These curtains fold into the front of the top when the latter is up. A new Circassian walnut cowl is used and all the instruments are now set flush. The running boards have been made clean and are now of aluminum instead of fiber as in 1913. The same change has been made in the toeboard. Right steer and right control are retained, but the wheel is notched so as to make steering easy.

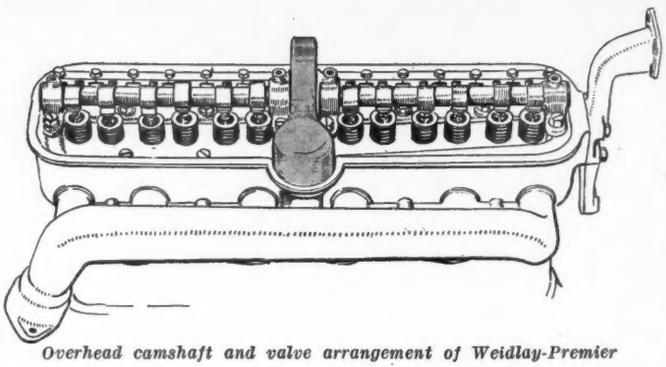
OHIO

Ohio is a four and Royal a six

THE Crescent Motor Co., of Cincinnati, which took up the running when a receivership stopped the Ohio Motor Car Co., is continuing the name Ohio, which is applied to the four-cylinder model, while Royal is the title given the six.

Most of the changes are found in the motor and bodies. On the six the motor is of the T-head type, with the 4 by 6-inch cylinder cast in block and the valves inclosed. Both valves and pushrods are lubricated from the crankcase, while the motor is lubricated by means of the constant level splash system, the connecting-rod

ends dipping into reservoirs under each cylinder, which are kept supplied by a plunger pump carrying oil from the lower half of the crankcase. Two small reservoirs over each main bearing insure a constant stream of oil to these parts. There is an oil gauge on the crankcase. The three-point suspension principle is employed, the front end of the motor being suspended from an arched cross member.



Overhead camshaft and valve arrangement of Weidlay-Premier

The four-cylinder motor on the Ohio model has its cylinders cast in pairs instead of in block, the cylinders being 4¼ by 4¾ inches. The gearshift and emergency brake levers in both cars are located in the center. The six is left steer and the four right. Both models are electrically started and lighted. The side lights have been abandoned, auxiliary bulbs in the headlights supplanting them.

Bodies are of the streamline type and with clean running boards. The gasoline tank is carried in the cowl dash, spares are carried in the rear. The six, which has a 132-inch wheelbase, lists at $1,985 fully equipped, and the four, 116-inch wheelbase, at $1,275, fully equipped.

PACKARD

Model 238 offered for 1913

PACKARD cars are made in one chassis model, 238, by the Packard Motor Car Co., Detroit. This car is a six-cylinder and all design features are preserved in this model while it presents the latest in equipment and construction throughout. The left drive and centralized control board feature on the steering column are now standard with Packard, and the location of the gearset in unit with the rear axle is unchanged.

Twenty-five body styles are offered on the new 238 chassis, which is now standardized, so to speak, so that all bodies are fitted, on the wheelbase of 140 inches. This is increased somewhat over that of last season's touring car and phaeton wheelbase lengths, which were 134 and 138 inches, respectively. For the roadster, too, this was formerly shortened up 115.5 inches.

It is in the motor that the greatest changes are to be found. While the dimensions of 4 inches bore and 5.5 inches stroke are retained, leaving the rating at 38, the L-head cylinders are now cast in blocks of three instead of in pairs. The motor develops about 60 horsepower at 1,800 revolutions per minute.

A new oiling system is incorporated by the use of hollow camshaft, drilled connecting-rods and crankshaft through which the oil is forced to the points of use. The electric system of the 238 is also new, in that a Bijur system with separate motor and generator.

Another feature new to Packard construction is the underslinging of the three-quarter elliptic rear springs. The fronts are mounted over the axle. The clutch is a dry-plate type and is inclosed in a dust-proof case with a ready,removable cover, thus providing a means of quick inspection.

The drive from the clutch is taken to a three-speed gearset a unit with the rear axle, Packard construction which has been a feature for many years past. The gearset is of the progressive type and both shafts therein operate upon ball bearings.

Though the external body lines are still distinctively Packard, they have been brought up to the minute in design. The hood slopes slightly from the cowl down to the radiator and the cowl rounds into the body. The chassis alone may now be had for $3,100. All open models except the special touring body are fitted with a one-man type of top.

A special six is offered at $3,350 which consists of the regular 238 chassis but the body is one of cheaper make and finish than that supplied by the Packard company. Continuing its policy of the past, the concern is offering every possible type of inclosed car from the three-passenger coupe selling at $4,450 to the seven-passenger imperial limousine listed at $5,150.

The Bijur electric system with separate motor and separate generator is used as well as the concealed oil leads for the motor lubrication system. A magneto furnishes current for the ignition system. A dry-plate clutch is housed in a rearward extension of the crank case.

PAIGE-DETROIT

Two chassis models, both four-cylinders

CONTINUING the policy of concentration, the Paige-Detroit Motor Car Co., Detroit, will build the same two chassis models this year as last. These models are the 36, the leader of the line, and the 25. Both have four-cylinder motors of the block type, which power plants, as well as all other parts of the chassis, show little or no change.

Four body types are fitted to the model 36 chassis, two open and two closed, while the model 25 appears in roadster and touring design only.

The model 36 motor is of the L-head type, with the gearbox bolted to integral crankcase arms which pass around the enclosed flywheel. The size is 4 by 5, the valves are on the left, and all of the electrical equipment, together with the centrifugal water pump, is carried on the right side. The intake manifold is very short, due to the fact that the gasoline tank in this car is placed under the cowl, allowing the carbureter to be placed higher.

The crankshaft is mounted on three bearings. A feature of this power plant is the silent chain drive for the camshaft, magneto shaft and generator. The lubrication system combines force-feed and splash in connection with the eccentric-operated plunger pump from the camshaft. The lighting and cranking apparatus is of the two-unit Gray & Davis type. The Bosch magneto is carried on both models. The clutch of the 36, as on the model 25, is of the multiple-disk, cork-insert type, running in oil. The gearset allows three forward speeds. The rear axle is three-quarter floating. Gear springs are full-elliptic, with scroll and shackle and underslung from the axle tubes.

The model 36 has a wheelbase of 116 inches and carries every necessary item of equipment. Tires are 34 by 4 on demountable rims, with non-skid treads on rear.

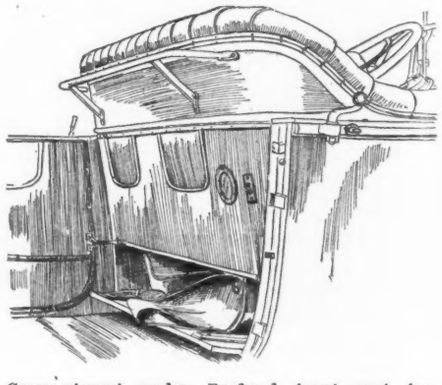
Like the model 36, the Paige has a unit power plant, although the general design of this engine is different from the larger. With a bore of 3.75 and a stroke of 4, the motor develops 25 horsepower normally. The cylinders are L-head, inlet and exhaust manifolds are cast integrally with the cylinder block.

PALMER-SINGER

Magic slide-valve motor adopted

THE Palmer & Singer Mfg. Co., New York, offers two six-cylinder models, a 40 and a 60, both equipped with the Fischer vertical slide-valve motor, The features of this motor are silence, economy, simplicity of construction and light weight. The cylinders have semi-spherical shaped heads with cylindrical extensions passing through the waterjacket into which the spark plugs are fitted.

The crescent-shaped valves form a part



Compartment under Packard front seat for luggage and tonneau light with switch

of the cylinder wall, taking up about 70 degrees of the circumference. These valve are on opposite sides of the cylinder, and at the upper ends have ports which register with ports in the cylinder wall. The valve-actuating mechanism is positive in both directions, the movement being accomplished by a bell crank and sliding block. The motor is lubricated by the splash-pressure system. The Palmer-Singer 40 is the same generally as the 60. The former motor has a bore and stroke of 3⅜ by 4¾ inches and the latter 4 by 5⅝ inches. In both cars the drive is through a disk clutch to a four-speed selective gearset.

The 40 has a wheelbase of 134 inches and with full equipment, including Westinghouse cranking and lighting, is listed at $3,250 in four and six-passenger touring form. The 60 has a 140-inch wheelbase and sells for $3,500, equipped.

Besides the Magic-motored models, there are two poppet-valve sixes rated at 50 and 45 horsepower and mounted on 134 and 128-inch wheelbases, respectively. Both of these cars are made up in touring and roadster with center control bodies as stock and other bodies will be made on order. The 50 is left drive and the 45 right with right control. Both motors are T-head designs and both of their cylinders cast in blocks of three. The motors, however, are of different design as well as dimensions. The 50 is suspended at three points and the 45 at four. The 50, which is the latest product of the Long Island concern, is a 4 by 5.5. The intake valves are located on the left side and the exhaust on the right; the intake manifold is cast directly with the cylinders.

The Palmer-Singer 45 has a 4 by 5 motor. The intake valves are located on the right side and the exhaust valves on the left side, the two camshafts being driven by helical gears, and the magneto and water pump being driven on the same longitudinal shaft. The same ignition, carburetion and cooling systems are used in this car as in the 50 except that the radiator is of standard design, whereas in the 50 a V radiator is used. A Westinghouse single wire 6-volt starting and lighting system is used on this car as on the larger one.

PATHFINDER

Two six-cylinder and a four carried

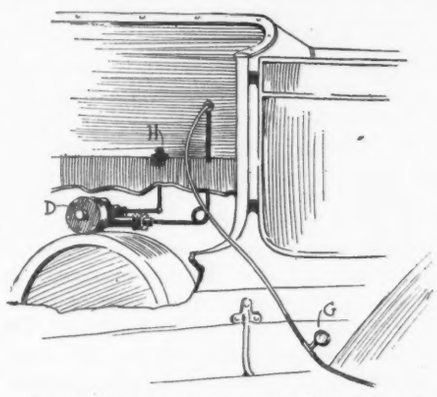
TWO six-cylinder chassis and a four make up the Pathfinder line for 1914. The Pathfinder-Continental motor is used in both models; the cylinders of the large six are 4.125 by 5.25, and of the smaller six 3.75 by 5.25 inches. The wheelbase of the large six is 135 inches and of the small six 125 inches.

The single four-cylinder chassis model, which was the sole design for 1913, is continued practically without change from the original design. The motor is 4.125 by 5.25 inches, and the only change is the lightening of the pistons of the Pathfinder-Continental. In other mechanical features the four is a replica of the past season's product. The general arrangement of the chassis is a unit power plant with the cone clutch in the engine flywheel, together with a selective three-speed gearset. The floating rear axle is employed. The drive is through a Pathfinder yoke and torsion tube assembly mounted on a heavy cross-member in the center of the frame.

One of the distinctions of Pathfinder design is the wheel which by the shape of the spokes and felloe is given a colonial effect. The maker calls it the chariot wheel. The design is a Pathfinder patent and is used on the six models also.

There are many points of similarity between the Pathfinder four and the new sixes in chassis design. The yoke and torsion tube is common to both and the theory of construction is practically the same.

The four-speed transmission is employed in the six, with direct drive on third, and a gear ratio of 2.7 to 1 on fourth for high-speed work. Left-hand drive is standard with the sixes and the conventional Pathfinder instrument board containing a novel combination utility and dash lamp speedometer, 8-day clock, switches and oil gauges is more complete on the six-cylinder models. A cowl gasoline tank is used with a filler neck on the instrument board on the right side.



Motor-driven tire pump on Pilot, driven by friction from flywheel, D being friction wheel, G pressure gauge and E is valve

A pronounced feature of the Pathfinder six models is the V-shaped radiator. The body design gives the same streamline effect. The chief changes in body design in the fours and innovations in the sixes are tendencies toward these streamline effects and more sweeping curves in the front fenders which are also made smooth on top.

Electric cranking and lighting is provided on all models and the electric horn has been added as standard equipment. Over-size tires are included on all models with Q. D. demountable rims and carriers on rear of fours and sixes.

The smaller of the Pathfinder sixes is designated as the Daniel Boone model; the other is the Leather Stocking. The former lists at $2,275 as a seven-passenger and $2,222 as a five or a two; the latter at $2,750 as a touring car.

The four-cylinder line consists of a Martha Washington colonial coupé, a five-passenger touring car, a two-passenger armored roadster and a two-passenger special cruiser.

PATERSON

Old fours dropped; new four added

THE W. A. Paterson Co., Flint, Mich., has dropped entirely its two four-cylinder representatives of 1913, models 43 and 47. Instead, an entirely new four-cylinder model is built. The general specifications covering this new left-drive chassis include a unit power plant with cylinder bore of 3.5 and stroke of 5 inches. The principle of the chassis as a whole is the two-unit construction whereby the power plant comprises one unit and the rear axle takes in the final drive and differential gears.

The valves are inclosed within cover plates, cooling is mechanically taken care of by a centrifugal water pump, and lubrication is by the constant level splash system with the oil drawn from the reservoir at the bottom of a positively-driven plunger pump. Combined Delco electric cranking, lighting and ignition is standard equipment at the price.

The Paterson chassis has a wheelbase of 112 inches. The propeller shaft carrying the power to the rear is enclosed within a torsion tube and has a universal joint at its front end. The rear axle is floating and mounted on Hyatt roller bearings throughout. The wheels are fitted with demountable rims and have 32 by 3.5-inch tires all around.

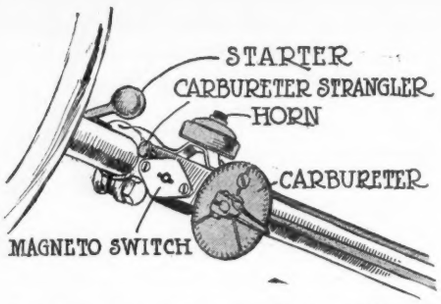
Paterson bodies of 1914 are of new design, with flush sides, concealed hinges and inside door handles. Comfort has been carefully considered, ample room being provided in both compartments of the touring car and in the roadster. The equipment leaves out nothing which the modern motorist requires.

PARTIN-PALMER

Valve-in-head block type power plant

THE most striking feature of the new Partin-Palmer 38, offered by the Partin Mfg. Co., Chicago, is the power plant, which is a block type with the valves in the head. The cylinder casting is integral with the upper half of the crankcase, eliminating the joint at the base. A departure from the standard overhead type is the head casting which is secured to the cylinder by bolts and which completely incloses the valve action, thereby eliminating noisy action. The joint between the casting and the cylinder head is sealed with a copper asbestos ring held with a pressure of more than 3,000 pounds per square inch. The casting can be removed by taking out the bolts which hold it.

The spark plugs are set at an angle in the head casting and the valves are carried



Arrangement of controls on steering column of new Paige cars

without cages. Both the valves and the stems are entirely surrounded by water. This water cooling which has been liberally designed is extended around the exhaust manifold and the makers claim that this is the effect of creating a partial vacuum in the manifold through the reduction of the temperature of the gases in the exhaust pipe, and that this results in an increase of 12 per cent brake horsepower. Accessibility has been studied throughout the motor, the pistons and connecting rods being easily removable without interfering with the radiator connections. Another feature in line with this is the split crankcase which permits the bearings to be reached without disassembling the motor.

Electric starting and lighting is furnished as an added figure and full running equipment is furnished with the car. Left drive and center control are used.

PRATT

Choice of four or a six given

THE Pratt line affords the purchaser either a four or six-cylinder model upon which a full line of bodies are supplied. The two chassis made by the Elkhart Car Mfg. Co., Elkhart, Ind., are not similar throughout, the six having left drive and center control and the four having right drive and right control. The six-cylinder chassis has 4.125 by 5.25 power plant with cylinders cast in threes. The cylinders are L-head the valves being located on the right, thereby providing a clear space on the left side for the mounting of the left drive steering gear. The magneto is driven by a longitudinal shaft on the right side and the pump is on the left. The manifold both intake and exhaust are on the right side. A Zenith carbureter to which the gasoline is fed from a 24-gallon tank in the rear is supplied.

The four-cylinder model has the 4.5 by 5.75 cylinders cast in pairs. They are L-head and unlike the six have their valves on the left side which may be expected, owing to the fact that right steering is used. The motor is cooled through a cellular radiator and a gear pump. Ignition is supplied by Bosch dual system and the gasoline system includes a Holly carbureter.

In the starting and lighting system both cars are alike, the Gray & Davis being used and operating through double wires at a voltage of 6. The clutch is a dry disk having raybestos friction faces. The gearset has three speeds and the rear axle is floating delivering the drive through the rear springs. The wheelbase of the four is 122 inches and of the six 134 inches. The equipment is the same in both models and among other things includes demountable rims all around.

PILOT

New chassis added; body lines refined

TWO essentially unaltered chassis and a new special chassis comprise the Pilot line for 1914, two models being known as the 50 and one as the 60, the 50s being of a four-cylinder and the 60, a six. The feature of this line is the equipment which includes besides the conventional appurtenances, such necessities as cigar lighter and trouble lamp, electric motor-driven horn, power tire pump, automatic headlights which turn in the direction in which the car is to be steered, rear view reflector and Neverout license bracket. The Pilot Motor Car Co., Richmond, Ind. is offering optional location of the steering post, whereas last year right drive was stock with this concern.

The special is a new creation with a 120-inch wheelbase selling at $2,250 in two-passenger roadster and five-passenger touring form. The only difference between the special and the regular 50 is in the gear ratio and as before mentioned in the wheelbase. The gear ratio on the regular cars is 3½ or 4 to 1 as desired but the special has a 2½ to 1 ratio. The four-cylinder motor has received only detail changes for the coming year, but as far as general appearance and arrangement is concerned it is the same. The motor dimensions are 4½ by 6, the cylinders are T-head construction cast in block.

The greatest advances have been made, in refining the body and the body details, the cowl shows more graceful lines, the hood biends better with the rest of the car and the clean running boards and curved fenders all go toward making an up-to-the minute motor car.

The Pilot 60 is almost identical with the 50 except as regards wheelbase, the larger car having 132 inches. The drive is by cone clutch through a selective gearset to a floating rear axle, the stock gear ratio being 3½ to 1. Both cars appear in roadster and touring form, the former with a two-passenger body and the latter with a four, five, six and seven-passenger touring bodies.

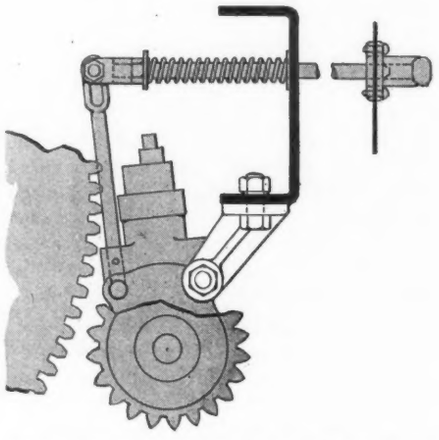
PEERLESS

Clevelanders continue their three sixes

THE three sixes which made up the line last year are continued by the Peerless Motor Car Co., Cleveland, with changes which follow the general lines of development for this season. The three cars are known as the 38-Six, 48-Six and 60-Six. They are all alike in principle and construction, merely varying in the weights and sizes of the parts. The most important changes have been made in improving the riding qualities of the car and the alterations have lowered the center of gravity considerably. The gasoline tank has been placed under the rear of the body and is now slung between the two side frame members. The tires are carried on a rack in the rear instead of on the running board. The springs have been made easier riding by using the same number of leaves but decreasing them in thickness and the front and rear axles are now fitted with shock absorbers. Another development in the way of easy riding is the 10-inch upholstery which is an inch deeper than last year. The equipment of the car has been made more complete and now includes a speedometer clock, combination bulb and electric horn and a power tire pump.

The sizes of the three power plants are 4 by 5.5; 4.5 by 6 and 5 by 7 for the 38, 48 and 60, respectively. Differences in the engine are small compared with last year, but a change may be noted in the pistons where three rings are now used instead of four. All three of these rings are located in the top of the piston and it is of lighter construction with a deep web for rigidity. The T-head cylinders cast in pairs are so designed that there is space between them to provide for seven main bearings. The valves are nickel steel and are operated from an eight-bearing camshaft. The camshaft, magneto and water pump are all driven through spiral gears of semi-steel running in oil. Gasoline feed is by pressure from a tank which is a new design for this year, being featured by very strong stiffening members. The tank has a capacity of 22 gallons and a dirt trap is supplied in the gasoline line. Electric starting and lighting are provided and ignition is by the Bosch dual system.

Peerless type of expanding hand clutch operating through a worm and screw is maintained. Friction surface is chrome leather with cork inserts which form about a third of the frictional surface. A four-speed gearset and a floating axle



Power tire pump attached to Pullman frame

make up the rest of the transmission. The muffler this year is placed lengthwise instead of transversely in the chassis. A full line of bodies is supplied with all models.

PIERCE-ARROW

Three chassis with many refinements

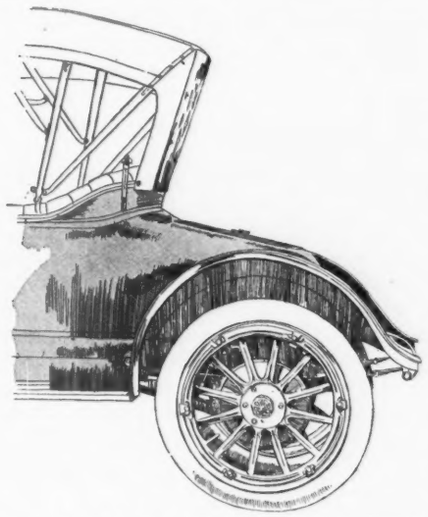
PIERCE-ARROW cars appear in three chassis forms, each with two wheel base lengths and known as the 38 C-2, 48 B-2 and 66-A-2. All Pierce-Arrows have six cylinders and changes have been made in many parts of the cars. All models now are equipped with forged steel flywheels instead of cast iron, because the teeth for the engagement of the electric cranking gear formerly were not tough enough to withstand the wear. The cast iron headed valves used in the 1913 models have been discarded and high-speed tool steel used instead and although this material is more difficult to forge, tests have shown that the results obtained are worth the extra expenditure in money and labor. It is claimed that these valves will not warp or pit and are much lighter, thus decreasing any tendencies to become noisy.

On the models A-2 and B-2 the number of water outlets have been doubled, thus increasing the circulation and avoiding any tendency on the part of the motor to heat excessively. To do away with clutch grabbing the Pierce-Arrow Motor Co., Buffalo, has eliminated the cork inserts of the cone clutch and instead are using flat steel springs under the leather facing.

Another improvement to effect smooth engagement, is the adoption of an inclosed dust cover over the clutch universal. This permits of more thorough lubrication of the square blocks and, it is stated, has helped considerably to make the clutch take hold smoothly. The oil pipes which previously had soldered unions now are flanged, thus insuring rigidity. The fan belt bracket has been redesigned so as to make the operation of belt adjustment easier. On the C-2 and B-2 the compression release has been discontinued owing to the installation of the Westinghouse cranking system. On the A-2 the release was considered necessary to retain the compression release in the remote event of having to crank the engine by hand under which condition it is almost impossible without a release.

The adoption of an electric starter on all three models to supplant the air starter of last season was deemed necessary. The foot throttle has been given a greater degree of travel, the air pump has been changed, and the secondary wire conduit replaced with a more efficient one. In order to enable rapid dismounting of the clutch the pedal shaft and bracket have been redesigned, and it is claimed now that the clutch may be removed in 20 minutes. Wider gears are used in the gearset to gain additional strength and longer life. A longer sliding boss is used for the third-speed gear, thus making it easier to slide into engagement, and the oil retainers at the front end of the gearset case of new design so as to eliminate oil leakage.

An oil reservoir has been provided inside the short propellor shaft near the universal joint and wicks inserted so that the lubricant will last a longer time and reach the desired points more easily. An interlocking device is now used to prevent the third-speed gear slipping out of mesh and although the installation has taken more delicate work the results have been found to have been worthy of the efforts. In order to compensate for the added load due to the numerous accessories placed on Pierce-Arrow cars, the axle shafts have been made heavier, and



Rear deck of Reo roadster, showing luggage-carrying capacity

a new design has been adopted for the oil retainers on each side of the bevel gears in the rear axle to prevent lubricant leaking upon the brake bands. The larger diameter shafts has necessitated increasing the size of other parts proportionally.

The headlights now are incorporated in the front fenders. A gasoline gauge is now located in a pocket between the two front seats where it can be seen easily and the gasoline shut-off valve has been made more accessible by providing a door in the right-hand apron and extending the handle of the valve through the underframe. The tread on the model C-2 and A-2 have been increased 1 inch to 57 in order to give a short turning radius, and in the case of the A-2 to get more tire clearance in the rear between the sides of the body and the tire.

A new type of hood catch is not used which is more accessible than the former type and also prevents breakage due to frame weaving. A new type of storm curtain is now used on Pierce-Arrow cars, these curtains being built under Jiffy patents in the Pierce factory.

Aside from the changes noted the three Pierce-Arrow chassis will appear as last year. The 38 C-2 comes in two wheelbase lengths 127 and 132 the 46 B-2 is 134 and 142-inch lengths and the 66 A-2, 140 and 147. In general design all three cars are the same. The motors being of T-head construction, the cylinders being cast in pairs driving a cone clutch through a four-speed gearset to a semi-floating rear axle. The motor dimensions on the 38-C-2 are 4 by 5½ inches, on the 48 B-2, 4½ by 5½ and on the 66 A-2, 5 by 7 inches.

POPE-HARTFORD

Model 35 four new in line

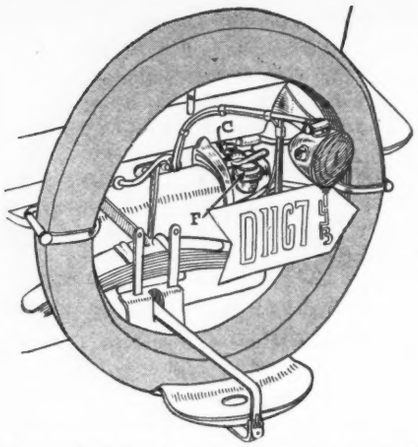
THE Pope Mfg. Co., Hartford, Conn., is marketing what is known as model 35. On this chassis there are three types of body, a five-passenger touring car, a two-passenger roadster and three-passenger coupé. The four-cylinder motor is cast in pairs and has the chrome nickel steel valves located in the head. The crankshaft is carried on three bearings which have a total length of 10.875 inches. The motor is oiled by a mechanical oiler which takes the lubricant from the crankcase reservoir and forces it to each main bearing and the cylinder wall, outside of this there is also a splash feed. The electric system of the car includes a Gray & Davis electric lighting and cranking outfit and Bosch high-tension dual ignition with a storage battery that is entirely independent of the starting and lighting systems. The current for lighting and starting is derived from a generator mounted on the left side of the engine and driven by silent chain from the pumpshaft. At a car speed of 12 miles per hour, the generator furnishes sufficient current to carry the entire lamp load and maintain the battery fully charged. The battery is located under the tonneau floor. The cranking motor is under the left rear support of the engine and is geared to the flywheel at a reduction of 21.5 to 1. The clutch is a cone faced with autobestine. It is provided with a clutch brake. The couplings and methods of adjustment of the clutch are the same that have been heretofore used in Pope practice. Drive is by shaft to a bevel gear and floating rear axle. Left steering and center control are used and the standard operating mechanism is fitted. Rudge-Whitworth wire wheels with one spare are fitted at an extra charge. The wheelbase is 118.5 inches.

PREMIER

Weidley motor put on new six

ONE of the sensations of the season in motoring circles is the new six announced by the Premier Motor Car Co., Indianapolis, Ind., the motor of which is a very decided departure from engine design in America. The Premier company calls it the Weidley motor, after its designer, George A. Weidley, chief engineer of the Hoosier concern.

The Weidley motor is of the poppet-valve type, but these valves are all in the head without cages and are operated by a single camshaft which lies above the cylinders. This overhead camshaft is



Rear end of Peerless, showing spare tire holders, showing filler cap F and gauge C

driven from the crankshaft by a vertical shaft through worm gears, or rather, 45 degree helical gears, and the whole mechanism, shifting, gears, camshaft and valves is completely inclosed and copiously lubricated. Twenty-three miles per gallon of gasoline on city streets in a touring car with four people up is the record claimed by Weidley with his new six, whose cylinders are 3⅝ inches bore and 5½ inches stroke.

The six cylinders are cast in one block together with the entire crankcase. The cylinder head is another unit and carries all the valves and the camshaft, while covering it is a smooth aluminum plate that makes an oiltight housing for the valve mechanism. Even the water pipes have been eliminated, the radiator being bolted to the motor itself without any rubber connections.

The valves are large, considering their location in the head; they have an outside diameter of 1 1/16 inch and a clear opening of 1 3/32 inch. There are no rocker arms used, the camshaft being right above the ends of the valve stems but between the cams and the stem ends is the end of a very light steel finger pivoted at the other end. This carried the adjustment by which wear can be taken up and replaces the usual valve-stem adjustment. Silence of the valve mechanism is one of the first subjects of comment.

The Remy starting and lighting generator, the magneto and the water pump are driven by a gear like that on the camshaft but located outside the vertical shaft gear so that these instruments are parallel to and on a level with the crankshaft. Mounted on the pump is a pulley for the fan belt.

Premier precedent is shattered in another respect. This is the unification of the power plant in the new design. In this the factory has gone beyond the practice of the strongest supporters of the unit power plant in making it complete by the incorporation of the radiator as a part of the unit. The essentials of the rest of the chassis do not differ greatly from previous Premier construction. The multiple-disk clutch is continued. The new gearset is a three-speed one with the control levers in the center and the driver on the left as formerly. The rest of the chassis is unchanged except the springs and frame. Rear springs on the new car are one-half elliptic instead of three-quarters.

The fuel tank is at the rear instead of under the seat. This tank is nearly half above the frame and the rear of the body cut away to fit it. Mudguards follow the contour of the wheels and are narrower than formerly, and to eliminate squeaks are not fastened to the running boards. The battery is hidden under the left apron where it is accessible.

The hood is remarkably short for a six, is exceedingly so in fact, for no one would recognize the car for the six from the appearance of the bonnet. The whole body has very smooth lines and the sides are particularly high. The wheelbase is 132 inches, tires are 36 by 4½. Four and five-passenger and seven and two-passenger bodies are marketed at a price under $2,500.

The older Premier, known as the model 6-48, is continued. This has a six-cylinder motor cast in threes of the T-head type, the cylinder dimensions being 4 by 5½ inches. Aside from the motor it differs from the new six so far as the chassis is concerned only in the semi-floating axle and three-quarter elliptic springs. The 6-48 bodies include a roadster and five-passenger at $2,785 and a touring seven-passenger at $2,900.

PULLMAN

Electric gearshift one of new ideas

TWO fours and two sixes make up the output of the Pullman Motor Car Co., York, Pa. Three of these models are continued from last year with improvements and one of the sixes is a new design throughout, embodying features which are new to Pullman practice of previous years, such as an electric gearshift. The improvements which have been incorporated in the standard models include a new piston which is fitted with an oil groove pierced by small holes to prevent an excess of oil being sucked into the cylinder. Another improvement is a micrometric oil level adjustment on the motor which displaces the oil level arrangement that used to be on the dash. Other improvements for the season are a pressed steel torque connection, Westinghouse starter, dog clutch for direct drive in gearset, removable gas tank, safety link on spring shackles to prevent rear springs from turning over, reserve feature in gasoline tank, lower cowl and beautified body of the Pullman.

The new six which has been brought out this season is an advanced design throughout, incorporating the latest ideas in every particular from the light six engine to the electric gearshift and streamline type of body.

The motor used in the new light six weighs but 600 pounds, including the flywheel and the regular equipment. It is a unit power plant and has its L-head cylinders cast in threes. The bore is 3.75 inches and the stroke 5.25 inches, giving an S. A. E. rating of 34 horsepower. The makers state, however, that the motor develops in excess of this. The valves are 1.875 inches in diameter and are carried on the right side of the motor. They are made with nickel steel heads and carbon steel stems.

The clutch has twenty-one disks faced alternately with raybestos and steelhead in contact by two independent springs.

The electrical equipment for this car divides itself into four independent systems for lighting, cranking, ignition and gear-shifting. Lighting and cranking units are supplied by the Westinghouse system and the electric gearshift is the Vulcan.

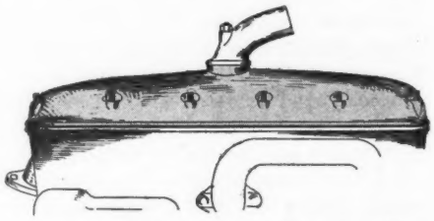
The generator, which is a slow-speed type, turning at 1.5 crankshaft speed, starts charging the battery at car speeds of 10 miles an hour. For city driving a dimming attachment is fitted to the lamps.

Left drive is used, the steering wheel column carries the buttons for shifting gears and also the control of the carbureter air supply. The emergency brake, which is the only lever on the car, is mounted in the center of the car.

RAYFIELD

Springfield concern has new six

INTRODUCING model D, a new six, the Rayfield Motor Co., Chrisman, Ill., confines itself to single chassis upon which any type of body may be secured. The 4 by



Top of Paterson motor, showing removable cylinder heads

5.5 cylinders are cast in a block forming a single part of the unit power which extends back as far as the gearset. The cylinders are L-head and have their valves on the left side. The valve motion is secured from a chain-driven camshaft and the magneto, water pump, etc., are also driven by silent chain and are located on the left side of the motor. The intake manifold is a unit part of the cylinders casting and the exhaust manifold is separate. The motor is lubricated by force feed, the oil being delivered by a gear pump through the hollow crankshaft under presure. Thermo-syphon cooling is used in conjunction with a honeycomb radiator. The carbureter is a Rayfield and is fed by pressure from an 18-gallon tank located at the rear end of the chassis and having a reserve reservoir of 1-gallon.

The electric equipment includes a Mea high-tension magneto for ignition and a full electric lighting and starting system. No battery ignition is used, the electric cranking being depended upon to crank the engine fast enough to start directly on the magneto. The clutch is a disk with raybestos against steel plates. It is located in the flywheel and delivers the power to a four-speed selective sliding gearset. The rear axle is floating and the propulsion is taken through radius rods. Thirty-six by 4.5 tires are used and the wheels are either wood or wire, this being optional with the purchaser. The wheelbase is 130 inches and the car is sold fully equipped.

READ

Detroit concern offers a new one

THE Read 30 is a newcomer in Detroit and is designed to sell for $850 with full equipment by the Read Motor Car Co. It is marketed in the touring car design only.

The motor of the Read car is a four-cylinder, block-cast type with valves on the right. The bore is 3.5 inches and the stroke 4 inches, developing 32.6 horsepower at 1,500 revolutions a minute. The ignition is by Bosch magneto of fixed type; a Stromberg carbureter takes care of the fuel, cooling it by thermo-syphon arrangement, and lubrication by splash.

With the motor is incorporated the clutch of multiple-disk type and the three-speed gearset, making the conventional unit power plant outfit. The drive shaft is inclosed with a torque tube and has a universal joint at the front. The rear axle is semi-floating, geared 4 to 1 and having the usual form of external contracting and internal expanding brakes. The rear springs are elliptic and underslung from the axle tubes. Wheels are of wood artillery type and fitted with 32 by 3.5-inch tires. The wheelbase of the car is 115 inches. Left steer and center control are incorporated, the steering wheel having a diameter of 16 inches. The standard body color for the Read is gray striped with black, running gear being black also.

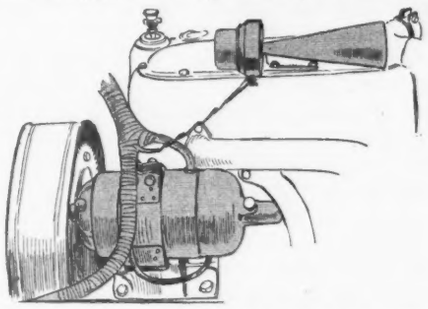
REGAL

Left drive adopted for 1914

THE new series of Regal cars made by the Regal Motor Car Co., Detroit, consist of four body models, three of which are built upon the underslung chassis, which has always been identified with cars of this make, and a five-passenger touring model built upon a conventional type of overhung chassis. This latter chassis was new to the Regal line for 1913, and is continued. The underslung chassis for all three models is of 108 inches wheelbase. The overhung model retains its wheelbase of 116 inches.

There are several changes, both mechanically and in the design of the bodies. The principal ones are the shifting from right drive and control to left drive and center control on both new chassis; the addition of electric lighting and cranking, the underslinging of the springs all around on the overhung model, a refinement of the clutch-operating yoke on the underslung chassis, the elimination of side lamps and the alterations in the body designs to bring them up to the latest dictates of fashion.

The underslung model has a four-cylinder, L-head, block-cast type of motor. The valves are on the left. The cylinder dimensions are 3.75 by 4.5 inches. Four integrally cast arms support the motor on a subframe, composed of tubular bars running lengthwise and parallel to the main frame, which bars are carried at either end on frame across members. The crankcase is of the barrel type, crankshaft has two bearings, camshaft has three; thermo-syphon cooling is used; the electric



Starter and horn installation on Regal motor

system is of the Rushmore make, with two units.

The overhung chassis has a motor of somewhat higher power than that mentioned above, although in general appearance it is much the same. Its cylinders are 4 by 5, of the L-head type, and cast in a block. The crankcase is split in halves, the upper carrying the three-bearing crankshaft.

The Regals have cone clutches and the rear systems of both are identical in design and consist of the gearset, inclosed propeller shaft and rear axle all in unit. The gearset gives three speeds and is compactly designed.

The bodies of these cars have been brought up to the minute. The flush sided effect has been carried out and the cowls sloped into the bodies proper. This season the Regal company is listing its cars with full equipment, whereas this formerly was an extra charge.

REO

Equipment more complete than before

A REDUCTION of $220 in the list price of the Reo constitutes the chief change made by the Reo Motor Car Co., Lansing, Mich. One of the talking points of the Reo has been its complete equipment and this is amplified in the latest cars, so that the equipment now includes electric lighting, cranking and signaling systems, and extra demountable rims. An innovation is a dimming attachment for the headlights. The bodies are of new design, hung low and with gondola back. A new style tire carrier on the back holds the tail light and number tag, so as to comply with all laws and save the owner trouble.

There are no changes of note in the original design produced in 1912, at which time it was distinguished by being among the first to adopt left drive and center control. Its general specifications as continued for this year include a four-cylinder motor with cylinders 4 by 4.5 in size with the inlet valve in the head of the cylinder and the exhaust valve in a pocket on the side. A centrifugal pump, assisted by a one-piece fan, takes care of the cooling of the motor.

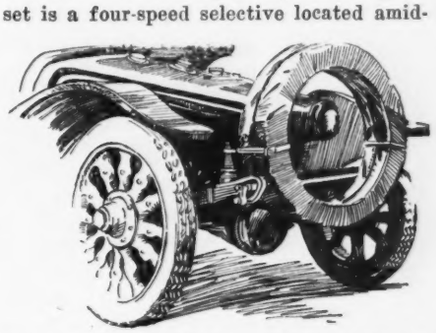
Double heating of the intake air is supplied by a hood on the exhaust pipe from the hot water jacket on the carbureter. From the motor power is transmitted through a multiple-disk clutch to the three-speed gearset operated by the Reo one-rod control. The new series has the lever moved back slightly to further clear the forward compartment. Both brakes are operated by foot pedals through cables. Tires on the Reo the Fifth are 34 by 4 inches and the wheelbase is 112 inches.

REPUBLIC

Specializes on six-cylinder type

UNDER the model name of series E the six-cylinder Republic car is marketed by the Republic Motor Car Co., Hamilton, O. It is thoroughly up-to-date, with the left drive and center control features together with modified streamline forms of body. The six cylinders are T-head and are cast in pairs. The dimensions are 4.25 by 5. The intake valves are located on the left and the exhaust valves on the right, the camshaft being driven by helical gears and chain. The motor is lubricated by force feed, the gear pump forcing the oil through a drilled crankshaft to the connecting rod and main bearings.

The motor is cooled by a centrifugal pump in conjunction with a cellular radiator. The Carter carbureter is used, to which the gasoline is fed by pressure from a tank of 24 gallons capacity located at the rear of the chassis. The electric system is combined with a starting and lighting and is the Delco dual. The wiring is by double wire and the system operates at approximately 7 volts. The clutch is a leather cone in the flywheel, and the gearset is a four-speed selective located amid-



Rear view of Pathfinder Cruiser, showing arrangement for real lamp in tail

ships. Final drive is by shaft to a bevel gear floating rear axle which delivers propulsive thrusts through radius rods. The wheelbase is 133 inches.

S. G. V.

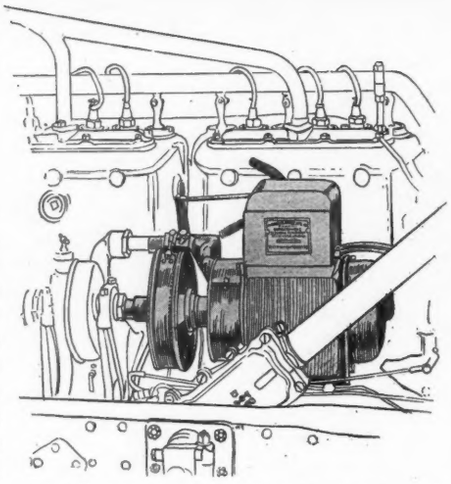
Another convert to electric gearshift

THE most interesting feature of the S. G. V. cars made by the S. G. V. Co., Reading, Pa., is the addition of the Vulcan electric gearshift. The power plant has been slightly increased in size, but this has not necessitated any marked changes in design. Only one style of chassis is being made for 1914 and upon this all styles of body, from a runabout to a limousine, are mounted. The body lines do not show any great changes, the touring car having an extended cowl and the five-seated inside-driven coupe or laudelet being the only style of body which this concern has not put out before this year. The motor dimensions has been changed from 3.75 by 4.375 to 3.75 by 6. The power plant is rated at 36 horsepower, but the makers state that it develops 51 on test, owing to its long stroke. The cylinders are L-head, cast together, carrying the valves all on the right side. The valves are large, having a diameter of 1.8125 inches. A pressure feed lubricating system is used, a gear oil pump driven from the rear end of the camshaft forcing the oil directly to the bearings. The pressure can be regulated by an instrument on the crankcase. The magneto is a Bosch high-tension type and the carbureter is a Zenith. The intake manifold is cast so that it is attached to the crankcase. The clutch is an all-steel multiple-disk, operated through a cam, which greatly reduces the pressure necessary to disengage it. Gearshifting is accomplished by pressing buttons which send an electric current through celenoid coils, thus exerting the pull on the shifting mechanism, necessary to make the gear changes. The U. S. L. starting and lighting system is furnished in this car, being incorporated in the power plant in the usual manner, in this system the starting motor taking the place of the flywheel. The same rear axle is used as in the past season, this being a semi-floating type with a cast steel housing, and brake brackets having the axle tubes shrunk in place without rivets.

SIMPLEX

Three four-cylinders in the line

THREE four-cylinder models, rated at 38, 50 and 75 horsepower, will be put on the market by the Simplex Automobile Co., New Brunswick, N. J. On the 38, four types of touring bodies, a four, five, six and seven passenger, two limousine and two landaulets are fitted as stock designs. Roadster bodies and other designs can be secured on any of the chassis on special order. All three Simplex models have T-head motors supported at four points, dry-disk clutches located in the flywheel, and



Electric generator mounted on Speedwell motor

four-speed gear boxes mounted amidship and supported at four points.

To take up the models separately, the 38 has a bore of 4.875 inches and a stroke of 6.5 inches. The cylinders are cast in pairs and have separately cast manifolds with the intake on the right side and the exhaust on the left. The motor is water cooled, a honeycomb radiator being used in connection with a centrifugal pump. Dual ignition is used, a Bosch high-tension magneto supplying the running current. The balance of the electric equipment is a Rushmore installation or the 6-volt type, operating with a single-wire system. The gasoline system is composed of a 28-gallon pressure tank and a Simplex carbureter. A shaft with bevel gear reduction of 2.75 to 1 on fourth speed or direct is used and the drive is taken through a torsion tube. The chassis weight is 3,600 pounds and the wheelbase 137 inches.

The 50-horsepower model, which is new this year, has a bore of 5.375 inches and a stroke of 6.5 inches. General design, position of the valves, etc., are very similar to the smaller model described above. The ignition, gasoline and electric systems are of the same nature. The drive is by double chains, incased, or by shaft. The propulsion thrust is taken through the radius rods with chain drive and by torsion tube in the shaft.

The 75-horsepower model has the same size cylinders as the 50-horsepower type, but owing to the fact that larger valves and manifolds and an altered cam design are employed, a motor of high power and high speed is produced. Ignition on this model is dual double, two sets of spark plugs being provided. The gear reduction is the same as on the 50, 2.13 to 1 being used on high or direct. Chain drive in 124-inch wheelbase; chain or shaft in 137-inch wheelbase.

SPOERER

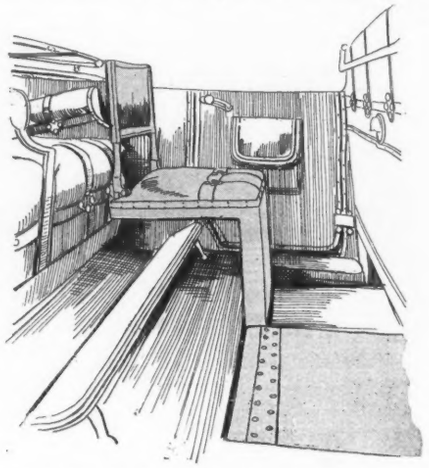
Baltimore concern features a four

UNDER the name of model 40 the Carl Spoerer's Sons Co., Baltimore, is making a four, having 4.875 by 5.5-inch cylinders cast in pairs. The cylinders are T-head having the intake valves on the right and exhaust on the left. The motor is cooled by a centrifugal pump which sends the water through a honeycomb radiator. The oil is strictly pressure fed, none of the bearings depending on splash, separate leads taking the lubricant to all bearings. The oil is circulated by a gear pump. A Stromberg carbureter is used, the gasoline being drawn from a 22-gallon tank located at the rear of the chassis and operating under pressure feed. The ignition system is a Bosch dual Z-R four type and starting is by the Gray & Davis system, a compression release being used on the exhaust valves. Electric storage battery, through a double wire system at 6 volts. The clutch is a leather cone carried in the flywheel and the gearbox supplies three forward speeds. Right control and right steering are used. The rear axle is floating and is a bevel type having a 3 to 3.5 to 1 reduction and transmitting the drive through radius rods. The wheelbase of the chassis is 120 inches and 37 by 4.5 tires are used all around.

S. & M.

Line of cars of foreign appearance

ENTERING the field this year with a six-cylinder car, made with three body types of European cast, the S. & M., made by the S. & M. Motor Co., Detroit, affords an attractive example of the streamline design. The power plant used in this car is the Continental light six, a unit con-



Tonneau of Stearns, showing disappearing auxiliary seats

struction combining the motor, clutch, gearset and electric starter. It is suspended at three points. The single point being located at the forward end of the motor and the other two points at the rear and formed by lugs which are a part of the crankcase castiag. The cylinders are cast in two blocks of three and are 3.75 by 5.25 inches. The valves are mounted on the right and are interchangeable. The crankshaft has three bearings and is of 90,000 pounds per square inch material. Oiling is by combination force feed and splash, the oil being maintained constantly at a definite level. The electric system is

divided into two distinct units, for ignition, starting and lighting. Ignition is furnished by the Bosch dual outfit and lighting and starting is by the Jesco system, working through a combined motor and generator. It is capable of spinning the motor from seventy and eighty revolutions per minute.

The motor generator is connected to the crankshaft by a silent chain and through an automatic clutch which releases in case of back kick.

The clutch is a Brown-Lipe multiple, disk and the gearbox a four-speed selective of Warner design. The rear axle is a floating Timken with a one-piece housing. The steering gear is a Gemmer. Two sets of brakes are used, mounted on the same drum.

The S. & M. line offers a choice of a five-passenger touring, two-passenger runabout and seven-passenger limousine bodies, all designed to secure a modified streamline effect.

SPAULDING

Sleeping car body radical feature

RADICAL body changes and minor mechanical changes are to be noted in the single Spaulding chassis. The model of the previous year, known as the G, has been renamed model H. The addition to the line of a sleeping car body which will allow of the transformation of a conventional-appearing touring car into a sleeping car in a few minutes time, is the feature. By dropping the hinged back of the front seat ample space is exposed for comfortable sleeping quarters. To make an overnight stop on the road enjoyable there is provided an electric reading lamp.

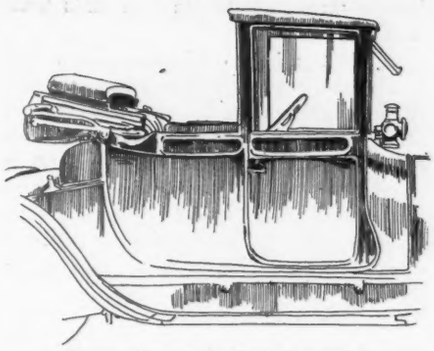
The regular touring body made entirely in the plant of the Spaulding Mfg. Co., Grinnell, Ia., will allow 4 inches more room over the back cushion and will have an instrument board on the dash. Streamline has been the word in Spaulding body design and this has been worked out more successfully this year than ever before. The cowl arrangement has helped this considerably and the placing of one gasoline tank in the rear and another in the cowl has augmented this. The fuel feed then first is by pressure from the rear tank to the cowl tank and then by gravity to the carbureter. The rear tank is hung low between the side rails of the frame and its transposition has permitted of the use of an 11-inch cushion in the front the same depth cushion being used in the rear.

The four-cylinder motor of 4¼ by 5½ inches remains unchanged, as does the running gear. Left drive and center control are continued with the Gray & Davis starter.

SPEEDWELL

Six continued with minor refinements

THE Speedwell six marketed last year under the title of series G has been continued with minor refinements by the Speedwell Motor Co. Dayton, O., and is now known as series H. The one chassis is fitted with a full line of body designs. The motor dimensions remain the same but some small refinements have been made on remainder of the chassis. The rear axle has now been fitted with a housing that incloses the torsion tube springs whereas last year they were left uncovered and the end of the torsion rod which was flat where it passes between the springs is now fitted with a ball. A safety strap has also been fitted to prevent the torsion rod from falling to the ground in case the front end should become loose.



Stevens-Duryea landaulet coupelet

While the price of the car remains the same as last year it is a better value on account of the more complete equipment. This year a two-cylinder power tire pump, battery indicator, Warner speedometer, oil feed indicator, quick-detachable storm curtains, gearshift lever lock are added to the regular equipment.

The 4.125 by 5.25 power plant is distinguished by its unit construction and three-point suspension. The cylinders are cast in pairs and have their water-jacket heads removable. The electric equipment includes a Wagner starting and lighting system and a Bosch dual ignition system. The battery is a Willard, charging at 6 volts but discharging at 12. The Wagner generator charges the battery at a maximum rate at car speeds between 15 and 18 miles an hour.

The Speedwell company is offering also a six-cylinder car with a 135-inch wheelbase and equipped with a Mead rotary valve motor. This motor was featured on the Speedwell a year ago, but many improvements have been made in construction. The bore and stroke of the rotary six is 4⅛ by 5¼ inches.

STEARNS

Streamline bodies, left drive, center control

THE two Stearns chassis models, a six and four, are continued and this year left drive and center control will be used by the F. B. Stearns Co., Cleveland. A steering column control board which is always under the hand of the driver has been fitted from which everything about the car but the starter may be operated. Another feature of this year's line is that in the four-cylinder model the rear axle gearbox has been discontinued and instead will be fitted amidships.

This year's car appears with clean running boards and a streamline form of body which tends toward the European in appearance. To the body line has been added a three-passenger roadster. Changes in the equipment include dropping of the bulb horn and in its place a Klaxon is fitted and a pantasote is used instead of the silk mohair.

The power plants for the six and four measure respectively 4.25 by 5.75 and 4.25 by 5.5 inches. They are both distinct designs of the Knight engine but that in the four differs more from the standardized design than does the six. The sleeve travel in the small engine is but 1.125 inches, approximately a tenth of the piston travel. This slow movement affords but little wear. Both models use disk clutches but in the six a four-speed gearbox is used while in the four there are three speeds.

Starting and lighting is by the Gray & Davis system in which the generator and starting motors are separate. The cranking motor operates through reduction gearing to the flywheel. The cranking motor is carried on a bracket back of the engine and bolted to the frame. The generator is driven by silent chain from the magneto shaft. Wire wheels are offered as an option.

STEVENS-DURYEA

Series C-Six marketed for 1914

THE series C-Six chassis is marketed this season by the Stevens-Duryea Co., Chicopee Falls, Mass. This chassis is made in two wheelbases, 131 and 138 inches. Six types of body, a two-passenger roadster, five-passenger touring car, three-passenger coupelet, five-passenger landau-phaeton, five-passenger demi-berlin and a seven-passenger limousine are mounted on the 131-inch wheelbase. On the 138-inch wheelbase four types of body are fitted, these being seven-passenger touring car, seven-passenger landau-phaeton, seven-passenger limousine and seven-passenger berlin. The price range is from $4,550 for the two-passenger roadster and five-passenger touring car up to $6,200 for the seven-passenger berlin.

The motor has six cylinders and these are cast in pairs. The bore is 4.9375 and the stroke 5.5 inches. The Bosch two independent ignition system is used and the Stevens-Duryea waterjacketed carbureter. The motor is oiled by combination pressure and splash system and is fitted with electric lighting including a generator mounted on the forward left side of the engine. The cranking system fitted on this chassis is operated by air pressure, the air being released by a valve located on the instrument board before the driver. The clutch is a multiple-disk dry plate and delivers the power to a sliding selective gearset having three forward speeds. The gearshift lever is what is known as the self-finding type. A bevel gear rear axle is used. It is floating and has an axle housing and seamless axle tubes. The

lower members of the rear spring are below this axle.

Wood wheels are fitted as standard on all models, but the Rudge-Whitworth detachable wire wheels are offered as an alternative at an extra charge of $200 per car. The tires fitted on all models on the 131-inch wheelbase are 4.5 by 37 inches with the exception of in the demi-berlin and limousine, where 5 by 37-inch tires are used. On the 138-inch wheelbase chassis all cars are regularly fitted with 5 by 37-inch tires. When wire wheels are specified they come with the Houk detachable feature. Exceptionally fine body work is a feature of Stevens-Duryea cars and they are all quoted at an inclusive figure as regards equipment, with the exception of the wire wheels.

STUDEBAKER

Models reduced to two, four and six

STANDARDIZATION of product is the keynote at the Studebaker Corp., Detroit, for 1914, and in line with this policy the number of different models has been reduced to two—a four and a six. For 1913 four four-cylinder types were offered in addition to the six. Both the new six and the new four have motors of the same cylinder dimensions of 3.5 by 5 inches.

Few changes in Studebaker basic construction are to be found in the new cars, although their outward appearance has been altered somewhat to bring the bodies up to latest design. The most noticeable outward change is the sloping hood, which at the rear meets the sloping cowl without break.

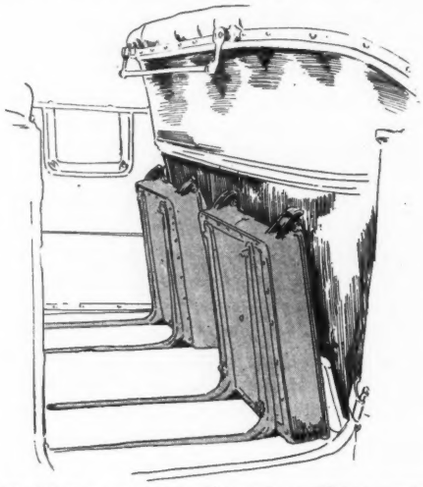
The most prominent mechanical change in the new Studebakers is the shifting to left drive and center control. Another important change is the placing of the gasoline tank under the cowl instead of having it under the front seat.

Two special bodies are offered this year in addition to the touring cars and roadsters. These are the landau-roadster and the sedan. The latter is furnished only on the six chassis. Prices for the four-cylinder cars are not comparable with any of last season, since the four is a brand new model. But referring to model 135, its nearest corresponding type of last year, the figure of $1,050 which is asked for the four in touring and roadster designs is $240 lower than the corresponding body types of this model 35. The six prices remain about the same as in 1913, $1,575 being the figure for standard bodies.

The new motors are of the L-head, block-cast type, with valves on the left. Though conventional poppets in most respects, these motors have an unusual feature in the transverse shaft at the front end, driven by a helical gear from the camshaft gear, and operating at its left end the centrifugal water pump and at the opposite end the ignition distributer. The bearings in these motors are the same where consistently possible, the four crankshaft having three and the six four main bearings.

Lubrication is by combination force feed and splash, while electric cranking, lighting and ignition are taken care of by the same electrical system as last year. This is of the Wagner make, but the form is altered in that the electric motor appears as separate units instead of being a combination unit. They are placed on opposite sides of the power plant, making a balanced construction.

The Studebakers have cone clutches, back of which the power is carried through unenclosed drive shafts to the gearsets which are in unit with the floating rear axles. This latter mounting of the gear-



Studebaker tonneau, showing auxiliary seats folded

box with the axle is characteristic of Studebaker construction.

The spring suspension of the four is new to Studebakers in that the rear springs, which are elliptic, are underslung from the axle. The six has three-quarter elliptics in the rear which are overhung. Tire equipment of the four is of the 32 by 3.5 inch size, while the six has 34 by 4-inch tires. The wheelbase of the four is 108 inches and that of the six remains unchanged at 121 inches.

STUTZ

Six and four motors on one chassis

A SINGLE chassis upon which a six and four-cylinder motor are interchangeable is the unusual feature of Stutz cars from the factory of the Ideal Motor Car Co., Indianapolis. The new line is known as series E; the 1913 was series B. On account of the two different motors employed the line is listed as two chassis, the E-4 and the E-6.

The new six-cylinder motor and the new four-cylinder motor are interchangeable insofar that they go under the same length of hood, and aside from the motors the four-cylinder and the six-cylinder cars are practically identical. The chassis are equipped with the same bodies whether the motor be the four or the six. Four bodies are fitted to either the six-cylinder or the four-cylinder models—two two-passenger bodies, the one a roadster and the other a racy creation known as the Bearcat, and both on a 120-inch wheelbase. The third body is a six-passenger touring car on a 130-inch wheelbase, and the fourth a coupé on a roadster chassis. Aside from the motors there has been little change in the cars except the abandonment of the disk clutch for the cone type. The Stutz combined gearset and rear axle have been retained.

Accomplishment of the feat of putting a six-cylinder motor under the same length of hood as the four has been made possible by casting the cylinders in sets of three instead of pairs as was done in the 1913 sixes. The new six is a little smaller than the original six which appeared in August 1912. It has a bore of 4 inches while the older one was .25 inch greater in cylinder diameter; the stroke, however, was the same, 5 inches. The cylinders are of the T-head type as in former practice and are offset .75 inch. The four-cylinder motor has the same dimensions as the old four, 4.75 by 5.5 inches, and the cylinders are cast in pairs.

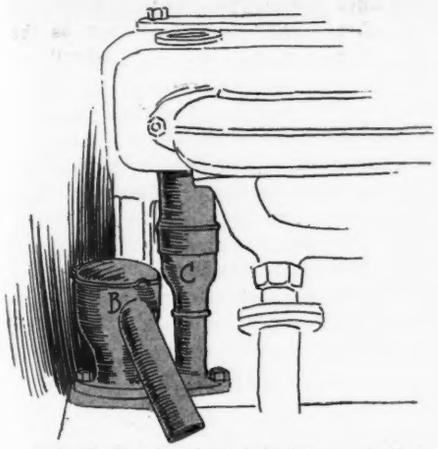
A unique feature of the motor is the method of inclosing the valve mechanism. Each pushrod and valve spring is inclosed separately by an aluminum housing split in the center. Electric cranking system consists of a separate motor and generator outfit designed by Harry Stutz, built by the Remy company. Another of the new features is the combination breather pipe and oil filler in which the air from the breather is directed downward. The prices remain the same as previously at $2,000 and $2,250 for the four and six-cylinder roadsters, while the touring cars are $2,150 and $2,400 for the four and six, which is an advance over 1913 list, $150 and $100, respectively.

TOURAINE

Variety of bodies on two chassis

TOURAINE cars are built on two lengths of wheelbase chassis by the Touraine Co., Philadelphia, Pa., there being mounted upon the 124-inch wheelbase chassis a two-passenger, four-passenger and five-passenger body, the two-passenger and five-passenger bodies being stock and the four-passenger bodies being built to order. Upon this same wheelbase is also offered a raceabout and inside-driven coupé, in addition to special model 114-inch wheelbase built up as a raceabout only. On the 134-inch wheelbase is mounted a seven-passenger touring car, victoria, limousine and landaulet models. All chassis are similar mechanically in that they are equipped with a six-cylinder unit power plant motor, multiple-disk clutch and four-speed gearbox flexibly mounted at three points on chassis frame.

The motor cylinders are cast in threes and are of T-head shape with a bore of 4 and a stroke of 5.5 inches. The maker's rating of this motor is 61 horsepower at a speed of 2,220 revolutions per minute. The intake valves are located on the right



Individual valve tappet inclosure of Stutz, shown at C, while B indicates unique breather

and the exhaust valve on the left side of the cylinder casting. Both camshafts are driven by spiral gears. The lubricating system is a circulating splash operated by a gear pump and the water-cooling system is operated by a centrifugal pump which forces the water through a honeycomb radiator. For ignition a Bosch dual system is provided. The gasoline system is a pressure feed with the gasoline tank swung on the rear. The capacity of the tank is 22 gallons and is used in connection with a 1.5-inch Flechter carbureter. Gray & Davis electric lighting and cranking system is installed and the storage battery which provides current for cranking the motor and operating the lights is a 6-volt Willard of 160 ampere-hours capacity connected up with the double-wire system. The clutch is multiple-disk running in an oil bath and having alternate plates of steel and raybestos. The four-speed gearbox is direct on third speed and has a ratio of 3.5 to 1. A ratio of 2.9 to 1 is provided on fourth. The rear axle ratio is 3.5 to 1. The drive is through a bevel type of floating rear axle and the propulsion thrust is taken through a torsion tube. The wheelbase of the seven-passenger car is 134 inches, the tread 56 inches and the artillery wheels carry 34 by 4.5-inch tires all around. Firestone demountable rims are provided.

TRIBUNE

Five-passenger four at moderate price

SPECIALIZING on a five-passenger touring car with a four-cylinder motor, selling at $1,250, the Tribune Motor Co., Detroit, has recently entered the field. The touring car is a roomy, five-passenger type designed along conventional lines and incorporates a four-cylinder, 3.75 by 5.5 Buda motor. The L-head cylinders are cast in a block and mounted at three points. Distinct features in the design of the motor are the three-bearing crankshaft, long pistons and accessible bearings, which may be reached by dropping the oil pan. Lubrication is by combination force feed and splash in which the oil is kept high-tension ignition is furnished together with Bosch plugs.

The clutch is a multiple-disk lined with raybestos and can be run either dry or in oil. The clutch bearings are balls and the gearset is a Brown-Lipe providing three speeds. The gearset shafts are mounted on Timken roller bearings. Both front and rear axles are Timkens. A feature in the rear axle design is the installation of a tube which extends from the brakes to a point close to the differential, the office of this tube being to check any flow of grease it may tend to collect on the brake band of the system.

Two sets of brakes lined with raybestos and providing 320 inches of braking surface are provided. Frames are single-drop, the steering gear a Gemmer, worm and full gear, and the ball-capped gear lever and emergency brake lever are attached directly to the gearbox. Wire wheels are specified on this car when desired. The gasoline tank is located under the front seat and has a capacity of 10 gallons. An auxiliary tank is mounted under the cowl and has a reserved capacity of 8 gallons. A feature of the control system are the pedals which are adjustable for any length desired by the driver.

TRAVELER

Two body types on a six chassis

A SIX-CYLINDER chassis which is distinctly in the $2,000 class listing exactly at that price in the five-passenger and two-passenger bodies has been put out by the Traveler Motor Car Co., Detroit, under the name of 48. The power plant is the Continental light six, 3.75 by 5.25 motor which provides a unit plant suspended at three points. The water circulation is maintained by a centrifugal pump and Mayor honeycomb radiator with German silver casing. Ignition is provided by the Bosch system and the carbureter is a Schebler. Electric lighting and starting is furnished at the inclusive figure by the Traveler company.

A Brown-Lipe multiple-disk clutch with copper raybestos facing transmits the power to a three-speed selected Brown-Lipe gearbox with chrome-nickel gears, providing a drive of 3.9 to 1 on third which is direct. The rear axle is a Timken floating and the front axle a Timken I-beam type.

Left drive, center control, the details of which are standard, is furnished on this model, the chassis weight is 3,000 pounds, the wheelbase 130 inches.

VAUGHAN

Distinctive streamline body used

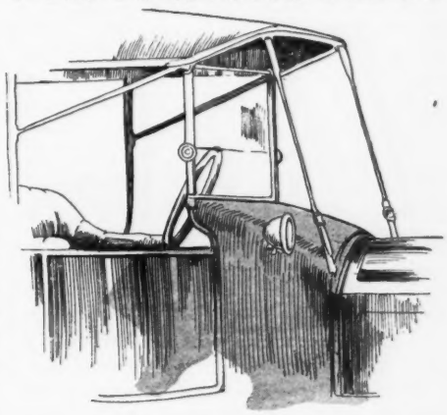
THE Vaughan is a new six-cylinder car made by the Vaughan Car Co., Kingston, N. Y., distinguished by several special chassis features and by a new adaptation of the streamline form made possible by the use of a high, narrow radiator. The motor forms part of a decidedly unit power plant, the cylinders being cast in a single block and the gearset and clutch being incorporated in an extension of the crankcase. It is a six-cylinder L-head design, having a bore of 3.75 and a stroke of 5.5 inches. The valves are on the right, permitting a clear space for the steering gear which is mounted on the left.

The pressure gasoline system is used and the tank is slung on the rear of the chassis in steel straps, hung from an extension on the frame. The capacity of the tank is 22 gallons, and pressure is maintained by a Hancock air pump built into the motor. The electric equipment consists of a Mea magneto and a Bijur 6-volt electric lighting and starting system. For ignition the magneto alone is relied upon, as the electric cranking motor rotates the crankshaft at 115 revolutions per minute. The electric motor engages with the flywheel by means of a worm and traveling gear which is automatically carried into engagement when the electric motor starts and thrown out when the engine starts to revolve. A 100 ampere-hour Willard storage battery furnishes the current for starting. The body work on the Vaughan cars is highly distinctive, the narrow radiator has permitted the designer to carry the streamline form without a break from one end of the car to the other. The bonnet line is carried up with a slope to the cowl, at which point there is a slight upward curve which breaks into an easy downward sweep and thence flows back in a straight line along the tops of the doors, terminating with a sweep at the back of the tonneau. The doors are exceptionally wide, measuring 24 inches, and additional space is gained at the rear by allowing the body to extend over the wheels, providing in the touring car a rear seat width of 43 inches.

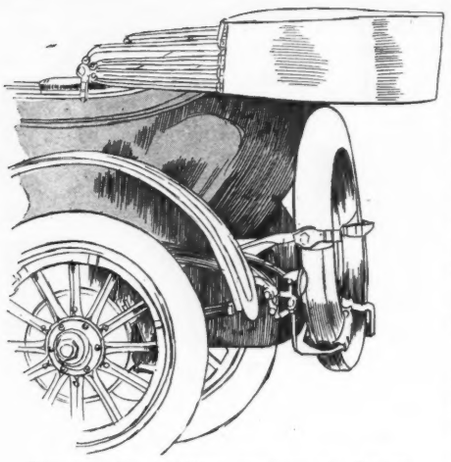
VELIE

Two four-cylinders and a six

VELIE products are marked by their entry into the six-cylinder field, although the four-cylinder cars which heretofore have formed the regular output of the Velie company, will be the leaders. The line embraces two four-cylinder models and a six-cylinder model. The two former are developments of earlier chassis. One of these is called the model 5 and is a



Deep cowl of Velie, with bullet-shaped dash lamps



Tire-carrying facilities at rear of Winton

development from the 4-32 of the present season, and the other, model 9, which is a development of the 4-40. The six-cylinder model is known as the 6-50 and is new throughout. A few sixes have been produced by the Velie factory in the past but not as stock product.

Model 5 has cylinders 4 by 5½ inches in size, which is an increase of ¼-inch in the bore, the stroke remaining the same. Model 9 is 4⅝ by 5¼ inches bore and stroke, which is ⅛ inch increase on the bore over the 4-40 of 1913. The six-cylinder is a Continental engine 3¾ inches bore and 5¾ inches stroke and is the only engine not purely a Velie product.

Prices remain practically the same as formerly for the four-cylinder passenger cars. Model 5 appears only as a five-passenger touring car of 113-inch wheelbase and 34 by 4-inch tires at $1,500. The 4-45 and the six-cylinder car have interchangeable bodies, that is the same body may be applied to both chassis, the 5 inches difference in wheelbase being due to the added length of hood of the six. These bodies are five-passenger touring car, four-passenger torpedo and a two-passenger roadster, listed at $2,000 on the four-cylinder chassis and $2,350 on the six. The larger four-cylinder chassis is 121 inches between wheel centers and has tires 36 by 4 inches in size. The six has 126-inch wheelbase and 37 by 4½ inch tires.

The three chassis are characterized by certain features of design which are common to them all. This includes the L-head motor system, dry disk clutch, floating rear axle, three-fourths elliptic underslung rear springs, left drive and center control and a European cast to the bodies.

Among the constructional changes on the two four-cylinder chassis the chief one on model 5 is the extension of the Gray & Davis cranking and lighting equipment to be included as stock equipment on all three models instead of only on the larger four, as obtained during the early part of the closing season. This has necessitated some changes in the arrangement of the motor appurtenances to properly locate the electrical apparatus. Also in the smaller four the fuel system has been altered slightly by the addition of a small ½-gallon auxiliary gasoline tank under the seat feeds to this small tank and thence to the carbureter to give a more certain fuel supply on hills. This arrangement has been necessitated by the lower position of the main tank due to the greater depth of upholstery. Changes on the larger four, model 9, include the removal of the fuel tank from its former position under the front seat to the rear axle and the installation in the gasoline line of a special fuel strainer under the hood.

Model 9 is the one typical of Velie design and incorporates more of the Velie features. The motor itself is an L-head design with the cylinders cast in pairs and incorporates two somewhat unusual points of construction. One of those is the chain timing drive and the other the worm-driven cross shaft at the forward end of the motor which operates the magneto and water pump. Another unusual construction is the arrangement of the carbureter and intake manifold. The former is mounted upon the right side, while the valves are upon the left side and is placed very high so that its float chamber is about level with the top of the cylinder. The intake pipe passes over the cylinders to the intake valves on the other side of the engine. This makes the carbureter very accessible.

Model 6-50 is almost identically the same design except the motor. From the engine back the larger four and six are identical. It has a Continental engine with its cylinders cast in threes. Model 5 differs from the larger four in the block casting of its cylinders, in the arrangement of its timing drive, which, however, is a silent chain as in model 9. Cooling is by thermo syphon. In the little four, the fuel tank is under the front seat and is gravity feed instead of pressure feed as was the previous Velie practice.

VULCAN

New concern in low-priced field

THE Vulcan 27, a new car made by the Vulcan Mfg. Co., Painesville, O., is made entirely in one shop and makes its way to the low-priced field. A roadster is being offered at $750 and a touring car at $850. The motor is in the true long-stroke class, having dimensions 3.375 by 5. Single ignition, thermo-syphon cooling, and 1-inch carbureter are used. The drive from the motor is through a cone clutch and thence through a three-speed selective gearset to a semi-floating rear axle. The wheelbase of the roadster is 105 inches, that of the touring 115 inches. Left drive and center control are used, and the tires are 32 by 3.5 inches all around. At the prices mentioned full equipment is given.

WAYNE

Three models, two fours and a six

THE Wayne Works of Richmond, Ind., is carrying three models, two of them fours and the other a six. The 40-horsepower four lists at $1,350, the 35 at $1,250, while the six is down for $1,500. The chassis on the three models are the same except that the six has a wheelbase of 123 inches, the 40 of 117, and the 35 of 114. The same bodies are fitted to all three models and the equipment includes Jesco electric lighting and starting, engine-driven tire pump, extra rim and tire hangers in the rear, concealed tool boxes, top and curtains, clear vision windshield, and 30 by 4-inch tires. No dash lights are carried, the headlights being equipped with dimming arrangements.

WINTON

Left drive one of new features

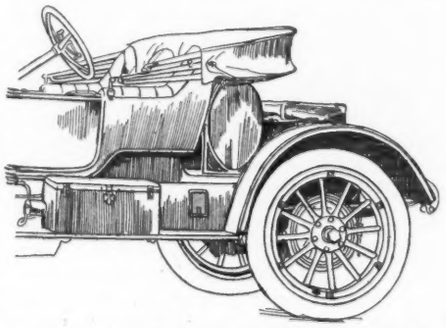
THE Winton six announced by the Winton Motor Car Co., Cleveland, differs from its predecessors more than was the case with any of the earlier cars. Left steering and center control are the cause for a number of changes which differentiate it from predecessors.

Among the foremost of the other alterations is the lengthening of the stroke .5 inch, so that it is now 5.5 inches, although the cylinder bore remains at its old figure of 4.5. By dropping the frame at the rear, both motor and body are given a lower suspension, amounting to 4 inches. The clutch release has been lengthened slightly to insure that there be no dragging and to increase accessibility.

Other alterations are more in the matter of equipment, the most noticeable of which is the absence of side or dash lamps. These are replaced by two bulbs in the head lamps. The pneumatic cranking system which has been a feature of the Winton cars for many years has been altered by the addition of a four-cylinder Kellogg pump, which supplies the air for tire inflation and also acts as a supplementary power plant for the air-cranking supply. No change has been made in the original system except in the connections to the two-way valve on the dash.

Some of the other new features of equipment are the mounting of the clock, speedometer, coil, switches, etc., on the cowl board, German silver finished radiator and the nickeling of other exposed parts. A primer from cowl to intake manifold and a hot-air tube to the carbureter have been added.

In general the Winton for 1914 is a six-cylinder car with L-head cylinders cast in pairs, a multiple-disk clutch, four-speed



White roadster body, with oval gasoline tank

gearset, floating axle, 130-inch wheelbase and 36 by 4.5-inch tires. Eight different types of open and inclosed bodies art fitted as stock.

WHITE

Three chassis retained; new clutch used

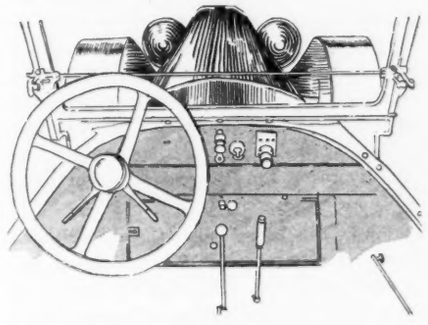
THE White Co., of Cleveland announces the retention in 1914 of all three-passenger car chassis, Thirty, Forty and Sixty, with new and highly developed body designs for all touring and inclosed cars and a number of important improvements in chassis and appointments.

The prices remain unchanged, although the improvements give each model a higher relative value. The five-passenger 30 lists at $2,500; the seven-passenger 40 at $3,500 and the seven-passenger 6-60 at $5,000. Inclosed bodies have been redesigned along advanced ideas of coach car refinement.

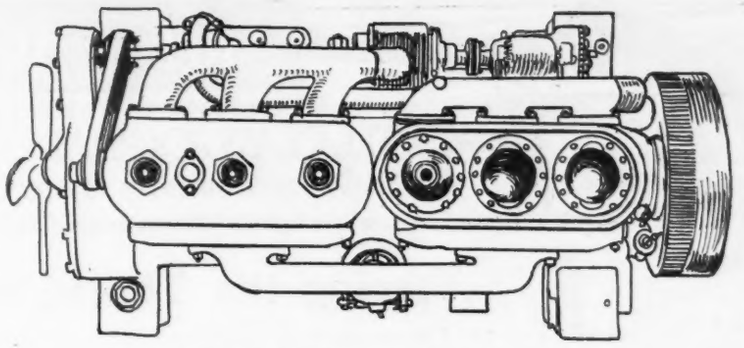
One improvement which applies to all cars is the use of a single-plate clutch running in a bath of oil instead of the leather faced clutch used heretofore. Another improvement which is embodied in all models affects the cooling system. It has been further developed by a new design of water passage from the top of the waterjackets to the radiator, combining the jacket coverplate and the outlet pipe in one integral forging. The honeycomb radiators are of larger size and capacity, and the top line of the bonnet is on a level with the top line of the body.

The wheelbase of the Forty has been lengthened from 120 to 124 inches and the stroke of the motor has been increased from 5.75 to 6.375 inches, the ratio of stroke to bore being 1.5 to 1.

While the long-stroke monobloc motor, electrical starting and lighting system, left side drive, center control and four-speed transmission are still the conspicuous features of the White line, the new models reveal great attention to the little things that are usually classed as refinements. For example, a new and simpler switch for operating the starting system and a switch for lighting the various lamps are mounted upon a special cast aluminum receptacle, which is built into the ventilator casting on top of the dash. This receptacle also contains a meter to indicate when the storage battery is being charged by the motor-generator and a separate switch for oil-gauge and speedometer lamps.



Looking down on Vaughan control board. Note pointed lines of hood



Top view of Palmer-Singer Fischer slide-valve motor

The head lamps of all models are built with dimming attachment, or rather auxiliary miniature lamps placed near the outer rim of the reflector so that there is no glare when the auxiliary lamps are lighted.

The new touring bodies are built on long straight lines with a full curved rear. The dash has no cowl. Instead, the top line of the bonnet and body extend in an almost unbroken straight line from radiator to rear seat, and the top line of the body is marked by a wide moulding carried entirely around the sides and rear of the car. All fitments such as door handles and hinges are visible.

The White coach cars, in addition to having improved vehicle lines, embody a number of new appointments. The berlin limousine has a two-way telephone with receivers and transmitters in the rear compartment and on a pillar beside the driver. The outside pillar lamps are of a new design having reflectors for illuminating the step in addition to the light from the step lamp. An 8-day rim winding and rim-setting clock and an electric cigar lighter of imported design are also included.

WESTCOTT

New four-cylinder supplements the six

CONTINUING its six-cylinder with a few refinements, principally affecting the body, the Westcott Motor Car Co., Richmond, Ind., has brought out an entirely new four of 30 horsepower. The motor is of the L-type, with its six cylinders cast in block and with a three-bearing crankshaft. The lubrication is effected by means of a self-contained force-feed constant-level splash oiling system, with the sight-feed on the motor. The clutch is a leather-faced cone and the gearset a three-speed. The Jones lighting, ignition and starting system is employed. Springs are semi-elliptic both front and rear, while the rear axle is semi-floating and the front I-beam drop-forged. The 12-gallon gasoline tank is placed under the front seat and the wheels carry 33 by 4-inch tires. The bodies are streamline and come in two and five-passenger sizes. The list on the new four is $1,385.

Show Dates for 1914

January 2-10—Importers' Automobile Salon, Hotel Astor, New York.
January 3-10—New York show, Grand Central palace.
January 4-8—S. A. E. meeting, New York.
January 5-10—Show, Los Angeles, Cal.
January 10-16—Milwaukee, Wis., show.
January 12-17—Philadelphia show.
January 10-17—Show, Cleveland, O.
January 10-21—Show, Brussels, Belgium.
January 12-17—Show, Bridgeport, Conn.
January 17-24—Show, Detroit, Mich.
January 19-24—Show, Washington, D. C.
January 24—February 7—Show, Montreal Can.
January 24-31—Rochester, N. Y., show.
January 24-31—Chicago show.
January 26-31—Scranton, Pa.
January 31-February 7—Minneapolis show.
January 2-7—Buffalo passenger car show.
February 3-7—Show, Kalamazoo, Mich.
February 2-7—Show, Troy, N. Y.
February 4-7—Show, St. Joseph, Mo.
January 5-10—Show at Los Angeles, Cal.
February 9-14—Buffalo truck show.
February 9-14—Show, Grand Rapids, Mich.
February 16-21—Show, Toronto, Canada.

ZIMMERMAN

Six-cylinder with 55-h. p. rating

UNDER the model name B-6 the Zimmerman Mfg. Co., Auburn, Md., is making a six-cylinder car rated at 55 horsepower. While no four-cylinder variety is made there is a two-cylinder rated at 20 horsepower. The six-cylinder chassis follows conventional designs throughout, having a choice of left or right drive and center control. The power plant is a 4 by 5, having the L-head cylinders cast in pairs and the chassis is provided with a disk in oil clutch and three-speed gearset. Remy dual ignition is used, a compressed air or electric starting and lighting system is provided and the car is sold with full equipment on a 132-inch wheelbase chassis.

The two-cylinder model has its 4.5 by 4 clinders cast singly and has a two-bearing crankshaft. The cylinders are L-head with the intake valve on the front side and the exhaust valve on the rear. Poppet valves are used and a gear-driven camshaft. The lubrication is by a combination of splash and pressure and the motor is cooled by air. On the six water cooling of course is used. The roadster selling for $450 is mounted on this chassis a friction clutch of steel against wood transmits the power to a planetary gearset located amidships, the wheelbase is 80 inches and the tread 56. The car is sold with a full line of running equipment.

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Tracing the Thread of Progress

WHAT will the New York and Chicago motor car exhibitions demonstrate so far as tracing the thread of progress is concerned? This question is being asked by nearly every buyer and by scores of makers, who in spite of the fact that they have followed very closely the announcements of the 1914 cars during the past autumn still are not thoroughly convinced as to the exact status in many respects of the 1914 line. Tendencies only can be obtained by mathematics, which in every case have to be tempered with cool judgment, in that totals and averages based on the actual number of companies making are misleading because often a large percentage of these names represent obscure concerns that cannot be considered as playing a big part in the evolution of the industry. Thus of 143 different companies listed in Motor Age's annual specifications published in this issue there are seventy-seven names that are largely local in so far as production and sales are concerned, as compared with sixty-six concerns that have selling organizations over the entire country and must as a consequence be looked upon as national manufacturers. Consequently conclusions should be based on the concerns that are national in character and produce in fairly large quantities.

FOREMOST comes the consideration of six-cylinder motors, which must be given credit for showing big increases in spite of the European tendencies, where France is pushing the six out and Great Britain is not strong for it. America is for 1914 stronger than ever in the six-cylinder field. There are today thirty-four companies building nothing but sixes, having discarded the four entirely and this list contains five new names representing five companies that have discontinued fours this year for the first time and gone entirely to sixes. These figures become more tangible when you remember that here are fifty-five concerns building fours only, in every-day language there are two-fifths more concerns building fours only than building sixes only.

THERE is a touch of disappointment when you scan the mixture list, those building fours and sixes. You might imagine it to be larger than that of those building fours only but it is not. Mathematics show only forty companies in the betwixt-and-between class or believers in the four-six program. These figures show a total of seventy-four companies pinning faith to the six either entirely or in part as compared with ninety-four holding to the fours either entirely or in part. You cannot shut your eyes to the progress the six has made, and when you analyze the figures still further, you find that the six has made progress with big producers, that is, concerns that count their outputs in the thousands.

THIS year must be looked upon as the season of the small six, that is, with cylinders under 4 inches in diameter, the most popular size being 3.75, although there are one or two with 3.5 and an occasional one as low as 3.375. The cylinder dimensions show that makers are trying to get a performing small six that will be relatively easy on fuel and tires. Some of these small sixes have set new low-water marks in weight reduction, coming under the 3000-pound limit, which is most commendable in that you must cut the weight when you cut the cylinder dimensions in these small sixes if you are going to have a car that will perform to the satisfaction of the buyer. Many buyers today are hesitating on the small six because of this performance work and it is a certainty that if these little sixes come up or exceed expectations in performance that there will be a much greater landslide to them next season.

STATISTICS show that there has been a very general expenditure of gray matter in engineering circles on the determination of cylinder sizes for this year and when anyone says that motors have not been changed they have yet another guess, they have not closely studied the tabulations of 1914. Of the 143 concerns listed in Motor Age specifications for this season, only eighteen of those enjoying national reputation have left their program undisturbed for 1914, whereas all of the others have been making adjustments, lopping off large fours or large sixes, perhaps lopping off medium fours and sixes and going entirely to small sixes and a medium size of four.

THIS year shows a concentration on some particular part of the possible motor car selling field, rather than trying to cover the entire field with a wide range of models. There are nineteen big companies that have reduced the number of models in harmony with this concentration policy, one company that listed five a year ago selling only one for this season. There are many examples of companies that had two last year but list only one this year, and others that have cut from three to two. There are only five companies in the entire 143 that have added to the number of models for this year as compared with last, and in nearly every one of these a new model has been added and some of the older ones carried along until the stock on hand for making them has all been used up, when they will be dropped and so the company will swing into the fewer models classification.

THE non-poppet valve motor has made headway during the year and has had its losses by firms using it being discontinued. The sleeve-type has been taken up by three additional concerns. The rotary and other non-poppet types are where they were a year ago. During the year numerous reports of other non-poppet valve designs have been rife, but to date the 1914 announcements do not show any of them as being adopted by any of the leading companies. There is a feeling quite general with several makers that the non-poppet has a bigger future in America.

IF 1913 was the full-dinner pail year for equipment, this year can be called a fuller dinner-pail one, in that nearly all of those companies that did not add every equipment needed are doing so this year and one concern has gone a step further and listed anti-skids for the tires as stock equipment. There are dozens of concerns this season listing electric starters and electric lighting as stock that listed them as extras last season. Today the starter, electric lighting, top, windshield, speedometer, extra rim and tire are generally stock, and the car is in reality ready for the road when purchased.

PRICES are generally lower, this often being the case although many new-equipment parts such as starter and lighting have been added. It is quite common to see the prices the same as a year ago, but with electric starting and lighting added as well as larger tires, a little longer wheelbase and a new design of streamline body. This year the buyer is getting more for his money.

Coming Back for a Better Bargain

When Broadway was an Indian trail and gunmen packed long bows,
When squaws thronged not the cabaret and tepees stood in rows,
Then the thrifty Holland trader
Played the role of the invader
With beads and rum and calico to tempt the docile Los.

When Tammany was copper red and not from Erin's isle,
And wore a feather head-dress and not a beaver tile,
He was loath to make a holler
When for twenty-four gold taler
He sold Manhattan island, for the bargain made him smile.

Now times have changed since those old days of centuries afar
And Tammany, though in his grave, has felt an awful jar;
And if the chief to life could come
He'd spurn the beads, likewise the rum
And trade his precious island for a high-class motor car.

Father Knickerbocker Ready With His 1914 Show

Seventy-Six Makers of Passenger Cars and 266 Accessory Manufacturers Will Exhibit at Grand Central Palace—Importers Also to Make Their Annual Display—S. A. E. to Hold Meeting

NEW YORK, Dec. 30—Trailing lusty young 1914 by only 3 days, the fourteenth national motor car show will open here at 2 o'clock Saturday, in the resplendent Grand Central Palace, where thousands of motoring enthusiasts and connoisseurs will have their first opportunity to inspect the offerings of the American manufacturers for the new year.

This exposition, which will continue for a week, will be the only one held in New York this season. Last year there were two shows running simultaneously in the Grand Central Palace and Madison Square Garden, but for 1914 the National Automobile Chamber of Commerce decided to concentrate its energies on one show, to be held in the larger of the salons, the Grand Central Palace. Another change in the 1913 exposition is that there will be no commercial car section this year.

That the 1914 show will be the largest in the history of the motor car industry is the announcement of Samuel A. Miles, the show director. There are 350 exhibitors in all, of which number seventy-six will show passenger cars, 266 will display accessories and parts, and the remainder exhibit motorcycles and electric passenger vehicles. Gasoline cars will occupy the first and second floors, and all the wall spaces of the third floor; electric cars will be shown on the second floor, and the accessories will be on display on the fourth floor of the palace.

The work of transforming the Grand Central Palace into a corinthian court is about completed. The color scheme is white and green. Great marble columns, entwined with smilax and vines, rise in splendor to the roof, and statues of Motoria, the goddess of motoring, have been mounted on pedestals about the building. Executed in plaster of paris, these statues depict the figure of a young girl in graceful wind-blown drapery gripping the wheel of a motor car. Exhibition spaces on all floors have been carpeted with a specially woven fabric of a maroon tint.

Comparison of the first show of 1900 with the impending exhibition tells the story of the progress of the motor car industry in America in 14 years. At the 1900 show there were only thirty-one exhibitors of complete motor cars, and but twenty concerns displayed accessories and parts. Steam-propelled vehicles predominated at the show of 1900, while the gasoline-driven machines were few indeed and in striking contradistinction with the present tendencies.

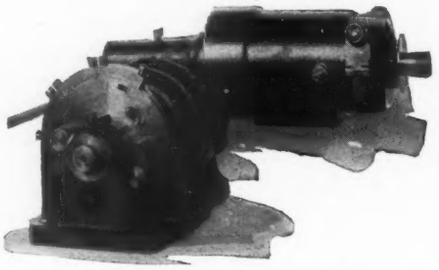
During the week of the show, the Society of Automobile Engineers and the Motor and Accessory Manufacturers will hold their annual meetings. The S. A. E. program consists of a reception at the Manhattan Automobile Club Sunday afternoon, a meeting of the standards committee on Monday, election of officers and annual reports on Tuesday, reports of chairmen of several divisions and technical talks on Tuesday and Thursday, and a banquet at the Hotel Plaza on Thursday evening. The eleventh annual meeting of the Motor and Accessory Manufacturers will be held at the Waldorf-Astoria Wednesday afternoon, to be followed by the annual banquet.

Converts to and admirers of European cars will have a chance to inspect the 1914 products of the French, English, German, Italian and Belgian makers Friday afternoon, when the annual importers' salon opens at the Hotel Astor. Among the few American manufacturers who will exhibit at this show is the Simplex company, which will display for the first time a new 50-horsepower chassis, the motor of which has a bore of 5⅜ inches and a stroke of 6½ inches.

ELECTRIC BRAKE ANNOUNCED

New York, Dec. 29—E. V. Hartford, of shock absorber fame, has just announced his latest invention, an electric braking system for motor cars, which may be operated from either the front or rear seat and which may be controlled to give any desired degree of stress upon the brake drums. The electric braking system may be installed upon old or new cars. The movement of a handle on the steering wheel closes an electric circuit which applies the brakes but slightly, while a double-braking effort may be had by opening and closing the circuit again. By pushing the lever as far as it will go, the device becomes an emergency brake.

The Hartford system consists of a small, high-speed, nonreversing motor with a worm and wheel attached to a drum. A cable is fastened to the drum, the other end of the cable being attached to the brake equalizer arm. The feature of the system is the current control, an entirely new type of controller being used. It is by the use of this controller that the current is so governed as to give any desired effect, from the extremely gradual to complete locking of the driving wheels.



HARTFORD ELECTRIC BRAKE

A safety device is introduced to prevent too great a force being applied to the brakes, this being in the form of a slipping clutch. The braking motor is operated by either a 6, 12 or 24-volt storage battery, according to the winding used. The installation of the Hartford system requires very little work, and the space occupied by the motor is not much more than required for a small battery.

The Hartford electric brake will be exhibited at the coming New York show, together with another recent Hartford accessory, known as the cushion spring. Hartford cushion springs are attached to the rear spring shackles and are designed to give greater flexibility in traveling over small bumps and ruts where the wheel action is exceedingly rapid. Thus the cushion springs take care of the smaller vibrations, while the shock absorbers, it is claimed, govern the movement of the entire frame and body against rebound. The Hartford cushion is in the form of a double-acting spiral spring inclosed in a steel tube.

PEERLESS ADOPTING AGENCY POLICY

Cleveland, O., Dec. 28—Expectations of a change of policy by the Peerless Motor Car Co. as a result of the entrance into the business of men who have been extremely successful in another field have been realized by the adoption of a syndicate selling for New York and Chicago. In order to reduce the overhead expense incident to using a large building exclusively for the sale of one car, an arrangement has been made whereby the McDuffee Automobile Co. in Chicago and the C. T. Silver Motor Co. in New York take over the entire business and equipment of the Peerless company's branches in those cities.

"It is our aim in taking this step to readjust the proportion between selling and manufacturing expense in Peerless cars," said E. J. Kulas, general manager of sales. "We have found that selling expense generally in the high-grade motor car business has been too high. And so far as the Peerless Motor Car Co. is concerned, we are going to correct that condition if we can.

"This new arrangement will enable the

buyer to select from a larger stock of cars the one most desirable for his purpose, as each of these companies will carry gasoline cars of lower price, and the Chicago house also has a line of electrics. It is well known that the dealer's margin of profit is lower than would be considered fair in any other retail business.

"Conditions have changed in the motor car business. The big demand has been supplied, and it now becomes necessary for the dealer and manufacturer to meet these changes in conditions. The plan adopted by the Peerless Motor Car Co. is a step in the right direction, and will be copied by others."

In Chicago, John R. Buck, general manager of the Peerless Motor Car Co., will join the McDuffee organization with all the men who have been most successful in developing the Peerless Chicago business, and in New York the corresponding members of the branch staff will be taken into the C. T. Silver company.

TAKES OVER CARTER CARBURETER

New York, Dec. 26—The Carter Carbureter Co., St. Louis, Mo., has been taken over by the H. W. Johns-Manville Co. The carbureter is of the single-jet type. One feature of it is the construction of the jet tube. It is a long tube rising above the gasoline level and having in its walls, spirally arranged, a series of very minute openings. The suction of the motor causes the fuel to rise in the tube more or less, according to the degree of pressure. The higher the liquid rises, the more holes it can flow through, the more air it will impregnate with vapor. The spiral arrangement of the holes insures direct contact with the air. The carbureters are made in five sizes, from 1 inch to 2, and the prices range from $20 to $45.

LANSDEN MEETING POSTPONED

Newark, N. J., Dec. 24—Henry L. Davisson, trustee in bankruptcy of The Lansden Co. of this city, has notified all creditors that the meeting which was to have been held January 7 has been postponed until January 21, owing to the difficulty of having a complete inventory and appraisement of the property completed. Sealed bids for all or any part of the property have been solicited, and this will be considered by the creditors at the meeting on January 21. The appraisers have valued the property, plant and equipment at $125,742.70, this including $10,000 for patterns, blueprints and drawings.

OIL SUIT DISMISSED

New York, Dec. 29—A case which has been running in the United States district court of the southern district of New York since February 9, 1912, has been dismissed with costs by Judge Mayer. The Valvoline Oil Co. brought suit against the Havoline Oil Co. and the Indian Refining Co. of New York for alleged infringement by the name of Havoline. The bill of complaint asked that the defendant be enjoined from using the word Havoline in gas engine and motor car lubricants.

NEW GAULOIS TIRE PRICES

New York, Dec. 29—The Gaulois Tire Corp., New York city, importing the Gaulois tire from France, announces that owing to the price of crude rubber having been reduced, it has revised its prices on its entire line of tires of all sizes, ranging from 10 per cent to 12 per cent over the present prices; for example:

	Old price	New price
34x4, plain	$35.05	$30.85
34x4, non-skid	45.30	41.30
37x5, plain	52.85	46.60
37x5, non-skid	66.50	64.40

SWINEHART ATTACHMENT VACATED

New York, Dec. 29—A motion to vacate an attachment granted to J. Z. Lowe, Jr., W. A. De Long and J. S. Harriman, in the state court, recently, against the Swinehart Tire and Rubber Co., has been granted by Judge Ward in the United States district court of the southern district of New York.

Suit was brought late last November against the Swinehart company by these three men, who are the trustees in bankruptcy of the New York Commercial Co. The suit involved an alleged breach of contract on the part of the defendants and the Cuyahoga Rubber Co. The complainants are asking for $22,362.67, with interest on $11,410 and $10,948.07.

It seems that the Swinehart company entered into an agreement with the plaintiff by which it guaranteed the performance of the Cuyahoga company of a contract which that company has repudiated, and therefore the plaintiff is suing for the price. The contract was on rubber to be delivered in the future to the Cuyahoga company, but which was not signed by it, but by the Swinehart company. After the rubber reached the plaintiff's warehouse, it is stated that the Cuyahoga company refused to accept the goods. The Swinehart company, it is alleged, then offered to buy the rubber for $20,000. An attachment was granted to the plaintiff, but this has been vacated because it could not be proved whether this company had really placed such an order.

NYBERG RECEIVER REPORTS

Frankfort, Ind., Dec. 29—Harry C. Sheridan, referee in bankruptcy, has issued a statement to creditors of the Nyberg Automobile Co., giving the final report of Receiver Carl F. Morrow. This shows that Morrow received a total of $3,451.25; that he paid out $2,947.74; that he turned over the balance of $503.51, together with all other property belonging to the bankrupt, to the trustees.

FALCON ON CYCLECAR TEST

Cleveland, O., Dec. 29—Starting at 1 o'clock Saturday, the Falcon cyclecar test chassis, a Cleveland product, designed and perfected by Cleveland men, left on a mid-winter test tour across the Alleghany mountains to Staunton, Va. The driver of the car is Bryce E. Blackley.

CYCLECAR RUN TO NEW YORK

Detroit, Mich., Dec. 30—Special telegram—The Detroit-New York cyclecar run started at noon today, headed by W. B. Stout of Chicago. The Imp was the only starter from here, but will pick up at Toledo the Rocket and Mercury from Detroit and a car from Chicago. Road conditions are reported bad as far as Buffalo.

POPE SOLE RECEIVER

Hartford, Conn., Dec. 30—Colonel George Pope will continue as sole receiver of the Pope Mfg. Co. in the Connecticut jurisdiction. This was the gist of a decision handed by Judge Case of the superior court today.

Moline-Knight Keeping Up to Mark

Engine Passes 233d Hour Without Mishap

NEW YORK, Dec. 29—At 12 o'clock noon today the Moline-Knight motor, undergoing an official test at the laboratories of the Automobile Club of America, had successfully completed 233 hours' run of the 336 which it is taking. At this hour the motor had shown an average increase of approximately 1 horsepower over that when the test started.

In a word, the horsepower is increasing slightly as the test progresses. The start showed 37.4 horsepower, and present readings show 38.5. The highest horsepower reading reached was 40.8 at the 204th hour. There is a slight variation of approximately a horsepower, according to barometer readings, thus the horsepower dropping gradually as the barometer readings drop, and increasing with the rise of the barometer.

From a work point of view, the motor is performing equivalent to carrying the car with load at 30 miles per hour on an 8 per cent grade. For 233 hours this shows at this speed a total performance of 6,990 miles. The consistency which the motor displayed in the early hours of the test is more apparent as the test continues, and not at a single time since the start has the horsepower fallen below the average for the first reading of the test. The test is made at a crankshaft speed of 1,100 r. p. m., which for a period of 233 hours means a total of 15,378,000 revolutions since the test began.

Duray in 300-H.P. Fiat Travels at Rate of 142.9 M.P.H.

Frenchman Eclipses Florida Beach Effort of Bob Burman

DURAY IN GIANT FIAT DRIVING KILOMETER AT RATE OF 142.9 M. P. H. ON ROAD AT OSTEND

PARIS, Dec. 16—Bob Burman of America, who in the spring of 1911 drove a mile at a speed of 141.73 miles an hour on Ormond beach, Fla., no longer can boast of having travelled faster in a motor car than any other man. With a 300-horsepower Fiat, Arthur Duray to-day attained a speed of 142.9 miles an hour in an attempt to secure the world's flying kilometer record. Although the racing machine was officially timed to travel at this speed, the official record was not secured, for the European regulations call for the distance being covered in both directions, and the average being taken. This failure was due to weather conditions. It is Duray's intention to make a further attempt early in April. He believes it is possible to show a speed of 150 miles an hour.

The attempt on this record was carried out on the shore road near Ostend. In one direction Duray had a run of 2,000 yards before striking the measured kilometer, and in the opposite direction about 1600 yards. The best officially timed run in one direction was at the rate of 139.8 miles an hour. Another run in the same direction showed 142.9 miles an hour, but on this occasion the electric contact of the automatic timing instrument recorded a streak instead of a dot and the rules made it impossible for Duray to have the benefit of the doubt. In order for the performance to be officially accepted, the return run had to be made within a quarter of an hour of the first trip. It was never possible to get such weather conditions as would make this possible, the attempts always being interrupted by strong wind from the sea, by rain, or by sand blown over the road.

The present European record is held by Victor Hemery, in a Benz, with which he covered the kilometer at Brooklands, on November 8, 1909, in 17 76-100 seconds, being equal to 125.9 miles an hour. This is the average for the two runs. Bob Burman's record, also in a Benz, when he covered the kilometer in :16 2-5, equal to 139.8 miles an hour, never has been recognized by the International Association of Recognized Automobile Clubs, for no proof has been given that it was the average in two directions and that the car was timed with the Holden electric apparatus.

Duray is not the only European driver that aims to shatter the flying kilometer record. Louis Coatalin, the owner of the twelve-cylinder Sunbeam, plans to send Chassagne after the record. The space-eating English monster will be equipped with double tires at the rear to guard against possible blowouts. Chassagne will make his drive for the kilometer record on the French roads.

MORE FRENCH GRAND PRIX ENTRIES

Paris, Dec. 19—Peugeot and Sunbeam have each entered three cars in the French grand prix, to be run at Lyons next July. The only other car entered at the present moment is an Alda. The Peugeot drivers will be Georges Boillot, Jules Goux, and Victor Rigal. The chief driver for the Sunbeam company will be Jean Chassagne, holder of the world's hour record on Brooklands track. In all probability the two other Sunbeam men will be Darius Resta and Kenelm Lee Guinness. Ordinary entries do not close until the end of January.

TENTATIVE CONTEST DATES SET

New York, Dec. 27.—The contest board of the American Automobile Association has awarded the following tentative dates: Indianapolis 500-mile race, May 30; Sioux City 300-mile race, July 4; Tacoma road races, July 3-4; Seattle speedway, July 13-14; Elgin road races, August 28-29; Cornona road races, September 9-; El Paso-Phoenix road race, November.

The contest board also has decided to increase the driver's registry fee from $2 to $3. For the first time mechanics too, will have to register, the fee being $2 annually. Both drivers and mechanics will be furnished with lapel buttons as well as their registration cards.

The A. A. A. has decided to incorporate cyclecar rules into the 1914 code and manufacturers are requested to send in suggestions.

DEATH OF LEON BOLLEE

Paris, Dec. 20—Leon Bollée, pioneer motor car manufacturer and head of the Leon Bollée Automobile Co., at Le Mans, has just died of an affection of the heart, at the age of 43. Leon Bollée was the younger son of Amedee Bollée, one of the earliest car manufacturers in France, and a man who played a role in his own country equal to that of Daimler in Germany.

In 1873 Bollée produced a remarkable car known as La Mancelle, having among its characteristics a vertical motor in front, clutch, shaft, gearbox and differential and final drive by side chains with the use of radius rods. At 20 years of age Leon Bollée produced his own car and with it covered 100 kilometres—62 miles—in 118 minutes. This was a remarkable performance at that time.

Leon Bollée took a great interest in aviation, and when the late Wilbur Wright made his first flights in Europe he placed his shops at the entire disposition of the American aviator. The first Wright European motor was built in these shops, under the direction of Wilbur Wright.

UNIQUE FRENCH CLIMB

Paris, Dec. 16—A 875-yard hill climb, with a 10-yard reversing test in the middle of it, was the Parisian sporting novelty yesterday. All the cars were given a standing start and had to tackle the 10 per cent gradient immediately. It was on the steepest portion, where the gradient is 13 per cent, that the drivers had to pull up beneath a line of flags, then back until they were beneath a sec-

ond line of flags 10 yards below. From this point they started away again and finished the climb.

Fastest work was done by Massuger in one of the new overhead valve Hispano-Suizas of 3.3 by 5.1 inches bore and stroke. Of three attempts, his best time was 58⅘ seconds. In addition to first position, Hispano-Suiza secured the three following places, and also sixth, seventh, and eighth positions. The firm lost fifth place to a Sigma light car, practically a cyclecar, handled in a remarkably clever manner by René Thomas. America was represented in this climb by two Fords, driven by private owners. They secured, respectively, nineteenth and twenty-fifth place. For this class of work the two-speed gear was a disadvantage.

USUAL R. & L. DIVIDEND DECLARED

Cleveland, O., Dec. 29—Directors of the Rauch & Lang Carriage Co. have declared the usual quarterly dividend of 1¾ per cent on the preferred stock and 2 per cent on the common stock, payable January 1. The company has no outstanding bonded indebtedness or mortgage, and it is officially stated that the company will end the year without liabilities of any kind other than the bills covering December purchases.

COMMERCIAL VEHICLES DEFINED

New York, Dec. 27—Owing to the decision of the manufacturers not to hold any national exhibition of motor trucks this winter and the consequent restriction of the annual shows in New York and Chicago solely to passenger cars, there was an apparent need for a definition that would make clear what types of vehicles are embraced in the term "commercial vehicle." Such a definition was considered at the last meeting of the commercial vehicle committee of the National Automobile Chamber of Commerce and recommended to the board of directors. It is as follows:

A commercial motor vehicle is a self-propelled vehicle designed to be operated without rails for the primary purpose of transporting materials, products, passengers or apparatus especially for business purposes or for hire, profit, emergency work, or special utility service as distinguished from private personal use by the owner or renter for enjoyment or convenience.

It will be noted that this definition excludes all vehicles that are not designed by the manufacturers primarily for industrial or commercial purposes. Thus, a machine designed for a taxicab, station wagon or motor stage is a commercial vehicle although it may be used as a private passenger conveyance by the owner. Fire apparatus, usually mounted on a truck chassis, belongs in the commercial class, but fire chiefs' cars belong in the passenger car class because they are touring car or runabout chassis fitted with special bodies and used for a special purpose.

Touring cars that have been converted to commercial uses by reconstruction are not included in the definition.

THE 300-HORSEPOWER FIAT

DURAY'S recording-breaking Fiat is a chain-driven car having a huge block four-cylinder motor of 7.48 by 10.4 inches bore and stroke. It follows the general Fiat racing motor design by having overhead camshaft and overhead valves, the whole being inclosed by an aluminum housing. The vertical shaft operating the camshaft is at the rear of the casting. Pump and magneto are driven by a cross shaft, also at the rear, the magneto being at the right and the pump at the left. The water intake pipe is carried alongside the motor from the bottom of the radiator to the pump at the rear, then back again with the two connections through the screwed-on copper jackets forming two big panels on the side of the motor.

There are two separate exhaust outlets, these being short lengths of pipe just sufficient to carry the exhaust gases outside the bonnet. Two independent carbureters are fitted, each one feeding a pair of cylinders. For the record attempts the car was fitted with a long windcutter ahead of the radiator, the opening for air to enter the radiator being only 2 inches across. A long tail also was fitted.

The car is chain-driven, and during the trials ran with Rudge-Whitworth wire wheels and Continental tires. Owing to the long stroke of the motor and the overhead valve gear, the car has an unusually bulky appearance, the height from the ground to the top of the bonnet being 5 feet 7 inches. This is the actual height of the motor, for between this latter and the bonnet the clearance is the smallest possible. The big Fiat is owned by Prince Soukanoff.

This is doubtless the biggest successful motor put into a chassis. In 1911 Nazzaro appeared on Brooklands track with a Fiat of 9.4 by 12.59 inches bore and stroke, but the car was so big and so hard to handle that it never did really fast work. Duray considers Brooklands unsafe for speeds of over 125 miles an hour, hence his attempts on the shore road at Ostend.

TWO MORE CANFIELD LICENSES

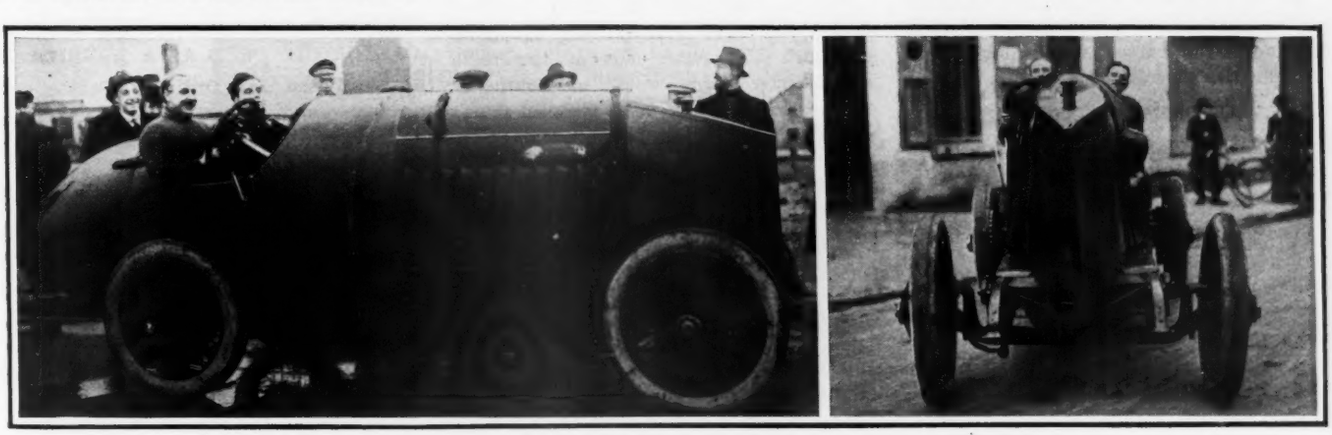
New York, Dec. 29—A. R. Mosler & Co. announce that the Bosch Magneto Co. of New York city and the Auburn Ignition Co., Auburn, N. Y., have taken out licenses to make spark plugs under the Canfield patent.

BEARINGS SUIT DISMISSED

New York, Dec. 30 — Special telegram—Judge McPherson, in the Philadelphia district court, dismissed the suit of the Hessbright Mfg. Co. and the Deutsche Waffen und Munitions Fabriken of Germany against Fichtel & Sachs of Germany, makers of F. & S. ball bearings, and the J. S. Bretz Co., representative for America, costs of suit to be borne by plaintiffs. The suit alleged infringement by Fichtel & Sachs of patents numbers 822,725 and 838,303, covering, among other features, a continuous and uninterrupted race type of construction in a ball bearing. The court held that the F. & S. bearing does not infringe. The Hessbright Co. will appeal from decision.

WARNES' LAW BEATEN AGAIN

Columbus, Ohio, Dec. 27—The Warnes Motor license law, which provides that owners must pay a state license fee according to the horsepower of their machines, was declared unconstitutional by Judge Kinkaid in the common pleas court. The court held that the motor tax is not an excise tax, as contended by the state. In a previous ruling in the case the court held that the law was unconstitutional in providing a license tax. The case was filed as a test suit on the new law.



SIDE AND FRONT VIEW OF 300-HORSEPOWER FIAT, WITH DURAY AT THE WHEEL
Note that onlookers in background are almost hidden by monster bonnet

The Readers' Clearing House

HIGH-TENSION MAGNETO OUTLINED

Has Both Primary and Secondary Windings on the Armature Shaft

REINHARDT, TEX.—Editor Motor Age—Describe the high-tension magneto and how it differs from the low-tension.

2—Are not the batteries used in connection with a high-tension magneto for cranking purposes known as the dual system?

3—Do the Overland, Imperial, Hupmobile and Pierce-Arrow have high-tension magnetos? —J. Boswell.

1—Ordinarily magnetos were arranged to generate current at about 6 volts, this current was then led to a spark coil and transformed into high-tension current in just the same way that the current from the battery is stepped up. Many of them are arranged to work that way now. Such magnetos are called low-tension magnetos, because the current as it leaves the magneto is low-tension current.

However, many makers of magnetos, in order to shorten the wiring and simplify the connections, have combined the spark coil with the magneto. Instead of having a separate core and separate primary coil, they have simply wound the secondary coil around the armature of the magneto, so the armature core acts as the core of the spark coil, and the low-tension winding on the magneto also serves the purpose of the low-tension or primary winding of the spark coil. Such magnetos are called high-tension magnetos, because the current as it leaves the magneto is high-tension current. Fig. 1 illustrates the principle of a high-tension magneto. The current is generated in the primary coil and a high-tension current is set up in the secondary winding. It is just like having a spark coil revolving between the poles of a magnet. The high-tension current is led directly to the distributor.

2—The dual system may comprise either a high or low-tension magneto and a battery. The definition reads, "the dual system is one in which two sources of current and one set of spark plugs, are employed."

3—The Hupmobile and Pierce-Arrow employ Bosch high-tension magnetos while the Imperial and Overland use low-tension instruments.

VIEWS ON PRESENT CONSTRUCTION

Repairman Wants Accessibility Made More Important Subject

Indianapolis, Ind.—Editor Motor Age—Speaking from the repairman's point of view, I wish to point out several prevailing faults of the common run of designers. In almost every motor built in America it is absolutely impossible to turn up the nuts holding the connecting rod caps to the rods with the aid of a socket wrench, and one ground to the thinness of paper at that. The bolts are so close to the bearing and are shielded on each side

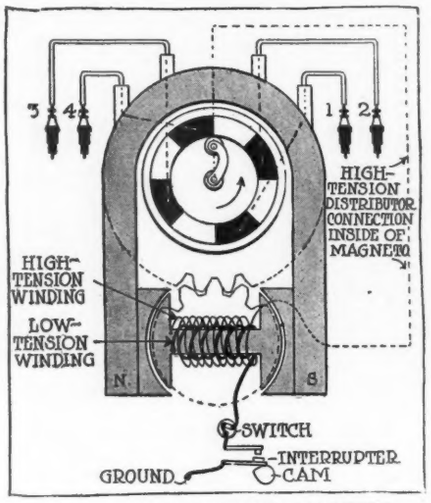


FIG. 1—HIGH-TENSION MAGNETO

The secondary winding is directly over the primary in which the current first is generated

by such a web of metal that the possibility of room enough for sweep with an end wrench is absolutely precluded. Much trouble to car owners and useless profanity on the part of repairmen could be eliminated by widening the rod ends even at the expense of taking a little weight from the H section where most rods are overly strong, for I believe they never break there.

Why must we go to the expense of making up new valves with oversize stems on account of wear of guides. After about three sets have been used a set of cylinders are worthless unless we bush the old guides, which is an expensive proposition. This is something careful designers have provided for particularly in some of the cheapest cars, by installing removable guides. Anxiously enough, the sponsers of some of our $4,000 beauties have overlooked it with far reaching results on the cars in second and third year service. For 4 years, to my knowledge, one axle company, whose product is used in several of our best-selling medium-priced cars have been putting out axles in which the outer ends of the teeth would, after a few weeks or months of service, chip off and the result of course would be a terrific back-axle knock. Sometimes housings are sprung and ruined, sometimes only a new set of gears is needed and in a few cases grinding the ends of the teeth will suffice.

A well known car has been made for a long time with screw-driver slots in the head of every bolt. It is very convenient, but since they sink each bolt into a recess so that one has to use a screw driver and cannot use a wrench it becomes a disadvantage. I can imagine what a time one has taking off a third member which is held on by screws sunk down into little cylindrical recesses, and please admit the folly of holding the large semi-circular clips around the back axle with large round-beaded machine screws, which after a month of service in wet weather become so rusted that it is impossible to budge them, not to mention the impossibility of screwing them up as tight as they should be with a screw driver. If designers would pay more attention to getting things apart easily and to make for easy upkeep and less to motor speeds and pistons weighing 2 pounds, the long suffering repairmen would bless them.—M. B. Goss.

WILL NOT START ON PUSH-BUTTON

Poor Mixture in the Cylinders Prevents Quick Firing

Hamilton, Ill.—Editor Motor Age—I have a car which will not start at all on the push button and has to be primed when it gets cool. It will be setting alongside other cars that start on a one-fourth turn, and I have to prime. It used to start on a one-fourth turn, and had to be primed only in cold weather. Often it started on compression. The original carbureter used so much gasoline, about 8 to 9 miles per gallon, that I changed to a model L Schebler and got from 15 to 17 miles per gallon, but I cannot get it to run perfect on low. The compression seems to be good, valve seats are good, and there is a good spark. With the Schebler I prime about twice on cool mornings and after the motor becomes hot it does fairly well. It has a hot-air intake on both air intakes on the carbureter. No leaks in manifold. What is the trouble.—C. E. Barnum.

That you cannot start on the push button is an indication that the starting mixture is not properly proportioned. You should remember that the motor will start on the button only if there is a combustible charge in the cylinders. Motor Age suggests that the adjustment of the gas may be such as to supply too lean a mixture, that is, a good running mixture, but one that is not suited for starting. In starting first close the air intake, then crank and keep the air intake closed until the motor is warm and then gradually open it. The model L Schebler has independent adjustments for high, low and intermediate speeds, so if properly adjusted there should be no trouble from carburetion.

CASTOR OIL USED AS A LUBRICANT

Not Advised for Ordinary Cars—Gums and Oxidizes Quickly

Dallas, Tex.—Editor Motor Age—Can castor oil be used in any type of motor gas engine, or motorcycle or cyclecar?

2—Will it ever be used nationally? What is the reason race drivers use castor oil in motors?

3—Does one mix anything with castor oil for use in an ordinary motor?—H. O. Claywell.

1—Castor oil is used extensively in high-speed motors, such as racing car engines and aeroplane motors, but there are many disadvantages which make it unsuited for ordinary types.

2—There is doubt as to it ever being used by motorists in general. Castor oil is a vegetable product and when used in

ordinary slow-speed motors will gum rapidly. The rate of oxydization is too great, in fact a discussion regarding the various components of castor oil shows immediately its unsuitability for ordinary gas engines. Racing cars and aeroplanes use it because of its high viscosity.

The chances of gumming and oxydization in high-speed motors is much less than in the slow-running motors and further, these conditions usually begin after the motor has stopped. Racing motors are stopped only after a race and then the driver cares little whether the cylinders gum or not, for they are cleaned thoroughly before the next race. In ordinary practice the starting and stopping, especially in cold weather, would seal the pistons almost. The odor of burning castor oil is another objection.

3—As far as Motor Age knows nothing has been found which when mixed with castor oil would make it suitable for ordinary use.

MAKING FLUID FIRE EXTINGUISHER

Formulas given—Ingredients are Simple and Cheap Compounds

St. Louis, Mo.—Editor Motor Age—What are the ingredients of a liquid fire extinguisher?

2—Could a handy man make a container?—W. J. Joza.

1—One of the best liquid fire extinguishers is liquid ammonia, the next best is carbonic acid gas. Another which has good qualities is composed of the following ingredients: Calcium chloride, 30 parts, magnesium chloride, 10 parts and water, 60 parts. Another is sodium chloride, or salt, 20 parts, ammonium chloride, 9 parts and water 71 parts. The latter will perhaps show better results than the one using calcium chloride.

2—Yes, but it would be better to buy the commercial extinguishers.

Cadillac Gear Ratios

Harrisburg, Pa.—Editor Motor Age—What are the ratios on the 1914 Cadillac on all speeds and reverse?—J. P. Jones.

The Cadillac has a two-speed rear axle, affording six different forward speeds and two reverse. With the rear axle gears in one position, the ratios are as follows: First speed, 12.20 to 1; second, 6.65 to 1; high, 3.66 to 1, and reverse, 15.91 to 1. With the other gears on the rear axle coming into play, the ratios are: First, 8.33 to 1; second, 4.54 to 1; high, 2.50 to 1, and reverse, 10.87 to 1.

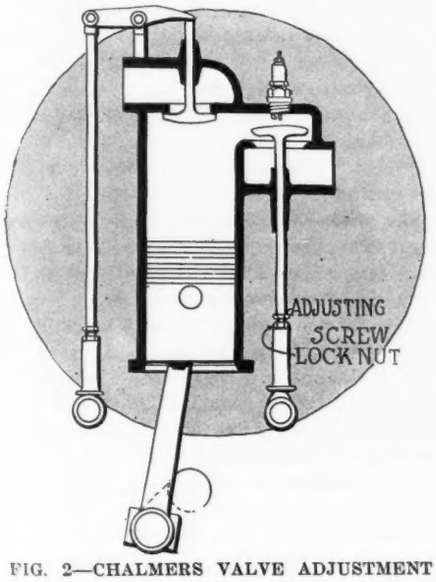


FIG. 2—CHALMERS VALVE ADJUSTMENT

The locknut first is loosened and the adjusting nut turned to take up excessive play

EXPLAINS FIXED SPARK IGNITION

Time of Complete Combustion Varies—Examples Given

Chicago—Editor Motor Age—In a current issue I notice a letter from J. W. A., Danville, Ill., regarding fixed spark for motor car engines, and this matter does not appear to be fully understood. With a fixed spark, although the time at which the spark takes place is fixed mechanically, the time at which complete combustion of the charge occurs is not fixed. This applies only to certain types of ignition.

Take, for instance, a Bosch magneto. The faster the engine runs with this ignition the more intense is the spark, and therefore the charge is fired more instantaneously. Now the only reason for advancing the spark is to obtain complete firing of the charge immediately after dead center, and at high speeds the combustion is commenced earlier by advancing the spark, so that at the moment the piston has passed dead center the full force of the explosion, or more correctly, extremely rapid expansion, is taken advantage of. Now, if when running slowly, the spark is weak, combustion will not be completed so soon, and when the motor is speeded up the spark is more intense and combustion is more rapid, therefore although the time for ignition is fixed mechanically, it is advanced and retarded automatically and at the correct moment electrically.

The same thing applies to the Delco ignition system. In this case a resistance is placed in the primary wire. When running slowly the points of the make-and-break mechanism are together a longer time, this causes the resistance coil to heat up, which gives it more resistance, which affects the primary current and therefore the secondary current to the plugs. A valuable fitting when using fixed spark is a hand-controlled air supply. When ascending a steep hill if the air is slightly closed off, enriching the mixture, the combustion will not be so rapid, and this will prevent the engine knocking, cause it to pull up the hill better, and will, in effect, be the same as retarding the spark with the original mixture.—Donald Herne.

PISTONS ARE STICKING TO WALL

Motor Probably Run Without Oil—Mason Motor Data

Moundridge, Kans.—Editor Motor Age—What motor does the Mason use in their latest model, and how many horsepower under brake test?

2—What motor does the Coey-Mitchell Special use, and also the Rea?

3—What causes the cylinders on a motor to stick, and how may they be loosened?

4—Is there a Mason agent in central Kansas, and where?—A Subscriber.

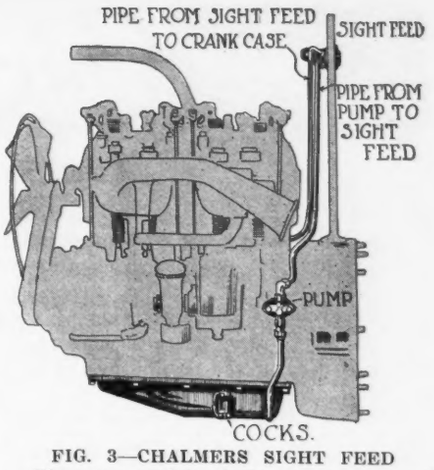


FIG. 3—CHALMERS SIGHT FEED

The pump used is of the plunger type and forces oil from the reservoir through the sight

1—The Mason uses the Dusenberg motor and a recent test of the 3 13-16 by 5-inch motor showed 51.2 horsepower at 2,000 r.p.m., according to the maker.

2—The Reo uses a motor made in its own plant, and the Coey uses a Hershell-Spillman motor.

3—You no doubt mean that the pistons are sticking in the cylinders. This condition may be caused by running the pistons almost dry in which case the cylinder wall becomes burned and the pistons stick.

4—A. K. Curtis is the Mason agent at McPherson, Kan., and V. W. Hoppes, at Long Island, Kan.

SOME CHALMERS FEATURES SHOWN

Valve Tappet Adjustment and Sight Feed Arrangement Given

St. Louis, Mo.—Editor Motor Age—Is there any way of silencing the valve tappets on the Chalmers 1912 30?

2—Was the motor used in 1912 on the Chalmers similar to the motor on the Bergdoll 30 of 1912?

3—Please furnish sketch showing dash, sight-feed of Chalmers.—J. B. Halpin.

1—The valve tappets of the Chalmers 30 are adjustable. By loosening the lock nut shown in Fig. 2 and then turning up the adjusting screw some of the clearance may be taken up. The use of fiber washers has been found to be helpful. These may be bought of any good supply house.

2—No.

3—The oil sight-feed arrangement on the Chalmers 30 is shown in Fig. 3. The pump is of the plunger type and forces oil from the reservoir through the sight feed to the crankcase.

Questions Answered and Communications Received

J. Boswell .....Reinhardt, Tex.
M. B. Goss .....Indianapolis, Ind.
C. E. Barnum .....Hamilton, Ill.
H. O. Claywell .....Dallas, Tex.
W. J. Joza .....St. Louis, Mo.
J. P. Jones .....Harrisburg, Pa.
Donald Herne .....Chicago
A Subscriber .....Moundrirge, Kan.
J. B. Halpin .....St. Louis, Mo.

No communication not signed with the reader's full name and address will be answered.

Cyclecar Development

American Maker Tells of Visit to Olympia Show

F. P. CHOATE, of the Puritan Cyclecar Co., Chicago, is a real cyclecar enthusiast. He has just returned from abroad where he studied the cyclecar movement and the cyclecars and light cars at the Olympia show. Mr. Choate is more than ever convinced of the possibilities of the cyclecar in America.

"The number of cyclecars seen in England is a surprise and the factories there are overburdened with orders, something like the factories here," he said. "I went to a week-end cyclecar rendezvous in Sussex not far from London one Sunday and was astonished to see at the appointed place more than 100 cyclecars and light cars assembled in the courtyard, machines that had run out from London for the picnic party and lunch. One group of three or four machines drove up for a few minutes and then taking a path through a field, climbed the side of a grassy slope to a shady spot and there spread out the picnic on the grass, the run through the field and up the very steep slope being made as much a matter of course as if they were on bicycles.

"Not many cyclecars are seen in the city, as driving in the traffic is very irksome and lasts for hours, but once in the country the little vehicles are very common.

"They build the cars there of any old tread and get away with it, for the roads of course are like a floor and the speed limit everywhere is 20 miles per hour. The tread is made to fit the design instead of the design to the tread. In this country the matter of tread is more important.

"Of course with the choice of treads and no strong winds they have gone to side-by-side seating abroad. The experience there makes me believe that here we will come to water-cooling for these cars here. This may not be a four-cylinder motor but may be of the two-cylinder vertical type with cranks opposite like the wonderful little Coventry-Simplex which has won almost every reliability competition of note over there on the G. W. K. friction-drive car, or like the Alpha motor somewhat on the same lines.

"The great surprise to the average man when he first gets into the cyclecar is of course the comfort and lack of all tendency to throw one from the seat. He has been given to understand in the past that a light car necessarily must be rough riding but the cyclecar has taught that the lighter vehicle even has advantages, since the load is so great a proportion of the total weight.

"We had the Puritan car out last week

By William B. Stout

and this was my first surprise. I had supposed the comfort abroad was due to the roads entirely—and on some of the cars it was, no doubt—but when I found this same lack of throw on very rough roads where big cars labored to get through I saw at once that there was more to the cyclecar than I had supposed, though I had been a staunch believer before.

"Another surprise was the speed with the small motor. Forty miles an hour was reached at one time and with no discomfort.

Mr. Choate is at present connected with Sears, Roebuck & Co., Chicago's big mail order house.

The motors spoken of by him have very great advantages for cyclecar work where water-cooling is necessary and there is no doubt but what this type will be popular in America. They have the cylinders side-by-side cast integral and are very simply made. The Coventry-Simplex has ball bearings and with the pistons on opposite throws of the crank. This balances the motor almost perfectly while the uneven firing is no disadvantage with the light cars. The power is greater for the same cylinder capacity than on a four and the rings can be made stiff enough and still slide into their grooves in assembling without danger of distortion or breaking, a trouble in small sized four-cylinder motors.

"There is very little that America can learn from Europe to help in building cyclecars for our sales and road conditions," continued the Puritan builder, "for there they have gone to too expensive constructions. The cost of the so-called cyclecar there is much too high, though the demand for the real cyclecar even there is greater than ever. They long for the day of a real two-passenger $500 machine.

"I had offers from almost every European country to handle the Puritan, and some were very insistent on getting cars at once. Russia, Spain, Portugal, Switzerland, Germany—every country in Europe in fact is waiting for a really cheap and reliable vehicle. I believe America alone can produce this car, for we only know how to handle quantity production—and the cyclecar must be made in millions. America will show Europe yet how a cyclecar should be built.

"As to the show, of course that too was mostly small-car, and yet the cyclecar movement is far from dead. As they are learning how to apply friction drive—and this is growing fast—more cars are coming out with this transmission system and hence lower priced cars for the performance are being made, notably the new Pyramid. The G.N., a very simple type of chain-belt machine, is continuing to make good, and belt-drive really is gaining. The show itself cannot be taken as a real criterion, as the greater number of cyclecar makers did not show.

"Of all the light cars the Humberette seems the favorite, and really is a very nice looking car. It is being made in thousands and it seems to be the Ford of England. It is too expensive for here however and would not stand our roads.

"The cyclecar is coming as sure as the sun. The vehicle can do the work, that has been proved, and can be made for the price. The time is ripe for those knocking the cyclecar to turn about and get posted."

Answers to Inquiries

BALL BEARINGS FOR REAR AXLE

Adapter Type Clamps to the Tubing at Any Point

CHICAGO—Editor Motor Age—I am planning to build a cyclecar and would like some advice: How can I fit ball bearings on a tubular rear axle and fit the side springs to the same fitting? The wheelbase is 105 inches, the tread 36 inches and the car is built for two passengers seated tandem.

I intend making a rear axle drive with a chain sprocket in the center. Please state what size tube I should use.—H. Stone.

The ball bearing fitted to the rear axle can be of the adapter type which will clamp to the tubing at any point. The springs can be underslung and a cast housing for the ball bearing can be fastened to the springs by clip in the usual manner. Dust caps should be fitted on either side of the bearing with felt washers, in the manner shown in all bearing catalogs.

Thirty-six-inch tread and tandem seating is correct, but with as long a wheelbase as 105 inches allow at least 9 inches road clearance.

For the rear axle use about 1¼-inch tube with a ⅛-inch call, the ends being turned down to fit the hub requirements.

Wants 4½x5 V Motor

Guthrie, Okla.—Editor Motor Age—Is it possible to procure a V-type motor with a 4½-inch bore and 5-inch stroke?

2—Would it be impractical to use such a size in cyclecar construction?—J. S. Suter.

Motor Age knows of no V-type motor of the size you mention in your letter. This motor is beyond the 71-inch definition and hence would not be available for cyclecar contests; also, its weight would be against it for cyclecar use.

The Motor Car Repair Shop

Operation of Brazing Parts

BORAX powder is used extensively for brazing purposes and comparatively clean work can be done with it if properly handled. A good workman will have the parts thoroughly cleaned, and apply the flux or borax only around the joints to be brazed, while a poor one cleans the parts in the neighborhood of the joints, but neglects to thoroughly clean the surfaces of the joints themselves; then, in the operation of brazing, he sprinkles a large amount of borax and spelter over the parts instead of applying just enough and in the proper place. By dipping the brazed parts in cold water immediately after the brazing and while still hot the scale of the flux generally is cracked off, or at least loosened.

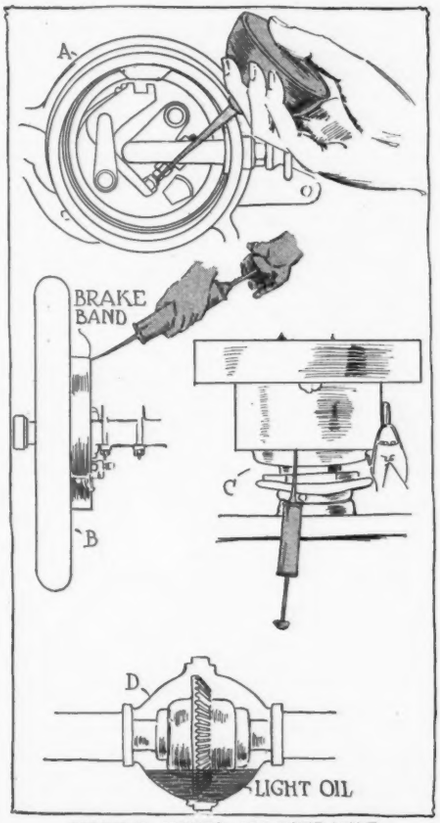
Brazing really is soldering with hard solder. Hard solder is an alloy of copper and zinc, consists of brass filings or chips, and commonly is called spelter. In order to secure the perfect union of metal bodies with brass as the agent of combination, heat and flux are the other essentials. There also are a number of conditions which are quite as important. First, the parts to be united must be thoroughly clean about the joints, in contact with each other, and should be held together securely with rivets, clamps, wire or some other means, in order that proper alignment may be maintained throughout the process. Second, the parts must be heated properly, the flux and solder distributed carefully, and all operations performed at the proper time.

In Fig. 1, part of the operation of brazing a flange to a section of tubing is illustrated. This job was on the water manifold of a motor car and, owing to the necessary bends in the tubing, it was required that the flange be in a certain position relative to the length of the manifold and its position on the motor. For this reason, after the manifold had been cut off to the proper length, it was placed on the motor with the end to be brazed resting loosely in the flange and arranged in its ultimate relation.

In this position the tubing and flange were marked carefully with a scratch awl, one mark being drawn around the circumference of the tubing and the other at right angles to it, half on the flange and half on the tubing, so that they both intersected at the same point on the line drawn around the circumference of the manifold. The flange and tubing then were removed and thoroughly cleaned with emery cloth where the joint was to take place. Care was taken, however, not to eradicate the marks. Then the flange was slipped on the manifold so that the marks lined up properly and four holes were drilled at convenient intervals through the boss on the flange and tubing and the two riveted together.

FIG. 1—PART OF A BRAZING OPERATION

The flux used consists of borax mixed with water to form a paste



TIMELY HINTS ILLUSTRATED

A—A drop of kerosene on the breaker points of the magneto will keep the points clean and prevent gumming and consequent short-circuiting

B—Rabestos brake bands will hold much better if a gunful of kerosene occasionally is squirted upon the fabric

C—Dry-disk clutches often are benefited by a treatment with kerosene. The clutch should be released and the nose of the gun directed into the clutch

D—The gearset and rear axle cases should be filled to the level cock with light oil at this time of the year

In order that the work be neat and to prevent the flux and spelter from running all over the flange, a trough was made around the joint with a composition consisting of a mixture of shredded asbestos and asbestos glue, or asbestos cement. The flux used in this case was a mixture of borax and boracic acid, and a small amount was mixed with water to form a paste and applied to the joint with a stick. The end which was to be held in the hand then was stuffed with waste to prevent the heat from flowing through the tubing, the job next was placed over a charcoal fire. Some of the larger pieces of charcoal were built up around it, and the flanged end slowly heated. When it began to take on a light red color a steel rod with the tip flattened out and bent almost at right angles was placed in the fire. In a few seconds both the end of the rod and the job had become heated to a light red color; the tip of the rod was removed from the fire and a small amount of flux powder was scooped up with the flat portion and applied to the parts.

Two or three doses of the flux applied in this way and carefully distributed were sufficient. The spelter was applied immediately afterwards in the same manner. It melted and flowed readily, and as soon as it had flowed all around the joint the parts were removed from the fire and allowed to cool.

Carelessness Causes Carbureter Complaint

Recently a careless motorist left the primer handle in the on position and for 2 days could not determine what caused his motor to misfire. Carbureter experts and repairmen all were baffled and the excessive flooding was stopped only by shutting off the fuel supply at the tank. One interested person traced the trouble to the primer and found that it was turned on. It would be wise not only to see that the primer handle is closed after starting but to examine the primer line occasionally for leaks.

Useful Life of Electric Bulbs

It is not wise to burn bulbs until they break. It has been found to operate lamps economically, only when they are giving more than 80 per cent of their initial candlepower, and that after the output has dropped below that figure the lamps are to be discarded. Thus if the headlights are of 8 candlepower, they are to be discarded when they show 6.4 or under. The consumption at the low candlepower figure does not make it pay to keep the lamps in service.

BIJUR System on Kaiser's Cars—Two new motor cars being built for Kaiser Wilhelm by a German manufacturer will be equipped with Bijur lighting and starting systems operated from Willard storage batteries.

Will Handle Carter Carbureter—The H. W. Johns-Manville Co. of New York, has completed arrangements with the Carter Carbureter Co. of St. Louis, whereby the former will have the exclusive sales rights in the distribution of the Carter carbureter.

Another Michigan Parts Concern—The Michigan Motor Car Parts Co. has been formed at Kalamazoo, Mich., has purchased the good will, service department and material of the Michigan Motor Car Co. and is now prepared to furnish spare parts to all Michigan car owners.

Getting Ready for Shipping Season—Five hundred motor car shipping cars for the Michigan Central division of the New York Central lines will be purchased through the sale of $10,696,000 equipment trust certificates as authorized by the Ohio public utilities commission December 23.

Purchases Recordograf Stock and Patents—The American Taximeter Co. of New York, manufacturer of Popp and Jones taximeters, has acquired the assets, stock, patents and good will of the Delivery Supervision Co., maker of the Recordograf, a combination time, distance, speed and stop recorder.

School for Truck Drivers—The Overland-Garford Sales Co., of Cleveland, O., has inaugurated a school for truck drivers to educate and bring about better understanding of the mechanism of the Garford and Willys trucks. No charge is made to students and the work is in the hands of E. G. Griese, G. D. Sturtevant and W. W. Wright.

Receiver for Gearless Motor Company—Upon the application of George L. Miller, a stockholder in the Yost Gearless Motor Co. of Springfield, O., J. K. Williams was named receiver and bond was fixed at $35,000. The assets of the company are given at $30,429.94, including materials and bills collectable. The indebtedness is said to be $20,297.94. The company has been operating the past 4 years with an authorized capital of $25,000.

Gallagher Company Purchases Foundries—The Gallagher Carburetor Co., Inc., of 1876 Broadway, New York, has purchased the Edwards & Smith Co., foundries, of Easton, Pa., and will operate under the name of Lehigh Valley Foundries and Mfg. Co., with head offices in Easton, Pa., manufacturing Gallagher carburetors and strainers, J. M. shock absorbers, special valves, including Standard Oil tank wagon faucets, Huyette steam specialties, Edwards' special valves and brass and aluminum castings of all kinds.

Ryan With Electric Steel Co.—The Electric Steel Co. of Indiana has employed James M. Ryan, formerly in charge of the steel casting department of the Canadian Pacific Foundries Co., Ltd., Montreal, Canada, as general manager of its factory soon to be erected at the Speedway industrial addition. Mr. Ryan is a foundryman of 19 years experience and for 7 years was superintendent of the Mesta Machine Works of Pittsburgh. Negotiations for the equipment of the new factory already have been begun by Mr. Ryan, who is to have charge of this branch of the construction. Only one electric furnace will be installed at first, the entire output of which is expected to be used by Indianapolis manufacturers, who are now buying their steel in the east and in Europe. Soon after the factory is in full operation the company expects to double its output of 3 tons a day by installing a second furnace.

Edwards Joins Puritan Machine Co.—G. D. Edwards, formerly purchasing agent of the Michigan Buggy Co., Kalamazoo, Mich., has been appointed service manager in charge of repair parts for Michigan and Warren cars, of the Puritan Machine Co., Detroit, Mich.

Van Patten to Handle Saxon—The Saxon car agency for New York has been taken over by L. A. Van Patten. Mr. Van Patten is at present connected with H. S. Houpt and sales manager of the latter's company and Lozier distributor in the east. He will retain his interest in the Houpt company.

Elect Officers for Coming Year—The Indianapolis Automobile Trade Association has elected the following officers for 1914: President, Frank L. Moore; vice-president, Herbert Hatton Rice; secretary, F. Ellis Hunter; treasurer, Fred I. Willis; directors, George A. Weidley, Harry L. Archey, Bruce M. Wylie, Leslie L. Banford and R. P. Henderson.

Goodyear Adopts Efficiency Plan—Knowing that workmen coming daily in contact with machinery or a certain routine of labor are in a position to suggest changes and improvements, the Goodyear Tire & Rubber Co., of Akron, O., has formed an efficiency and welfare department which encourages employes to make suggestions that will make for greater efficiency and safer operation. These suggestions are considered each week and if adopted are paid for.

Washington Dealers Organize—The Automobile Trade Association of Washington, D. C., has been formed by a number of dealers who met recently and brought the organization into existence, with the following officers: President, J. M. Stoddard; secretary, R. H. Martin; treasurer, M. T. Pollock; board of control, Claude Miller, H. B. Leary, Jr., W. S. Keeler. The charter members represent the following makes of cars: Cadillac, Pierce-Arrow, Franklin, Locomobile, Buick, Ford, Studebaker, Oakland, Oldsmobile, Overland, Packard, Rauch-Lang, Maxwell, Mitchell, Rambler, Chalmers, Reo, Baker.

Stearns Declares Cash Dividend—The F. B. Stearns Co., Cleveland, O., declared a cash dividend of 10 per cent on the capital stock on December 23 in adition to the 8 per cent cash dividend paid on July 1, 1913. The action was taken at an adjourned meeting of the directors. The company has no preferred stock and there are no bonds or mortgages. The officers were re-elected as follows: President, Frank B. Stearns; vice-president, Roy F. York; secretary and treasurer, E. McEwen.

Say Motor Company Is Bankrupt—An involuntary bankruptcy petition has been filed in the United States district court of New York against the Kirkham Motor Mfg. Co., of Bath, N. Y. Three York banks have claims against the Kirkham company and are the petitioning creditors, each alleging that the Bath concern is insolvent. The claims filed against the company are Fifth National Bank, $4,000; York National Bank, $8,000; City Bank of York, $2,500. The officers of the Kirkham company are York men and it is natural that they should have secured their funds from that town. The company manufactured motors chiefly for aeroplanes. At one time many hands were employed, but recently the plant closed down, throwing many men out of work.

New Corbin-Brown Plant Completed—The maker of the Corbin-Brown speedometer has completed a new 100 by 120 foot six-story brick addition to the main plant at New Britain, Conn., taking occupancy January 1.

Gearset Makers Lease Factory Site—The Direct Drive Axle Co., which was incorporated with a capital of $10,000 to make all kinds of motor car transmission, has leased a tract in Columbus, O., upon which it is proposed to erect a factory. C. T. Phillips is at the head of the concern.

Hupmobile Has South American Manager—Peter Severin Steenstrup, formerly general sales manager of the Hyatt Roller Bearing Co., has joined the staff of the Hupp Motor Car Co., as general South American representative. He will sail from New York January 15, and will make his headquarters in Buenos Ayres.

Engine Makers Organize—To promote a better spirit among motor car engine manufacturers, the Automobile Engine Manufacturers' Association was organized recently at the Statler hotel, Cleveland, O. The following officers were elected: President, Charles John, Wisconsin Motor Mfg. Co., Milwaukee; vice-president, A. F. Knobloch, Northway Motor Mfg. Co., Detroit; secretary-treasurer, A. R. Clas, Falls Machine Co., Sheboygan, Wis. Fifteen engine factories were represented at the meeting.

Canadian Tire Factory Opened—The new million dollar factory of the Dominion Tire Co., Limited, at Berlin, Ont., was opened recently. The new factory is constructed of reinforced concrete and is one of the largest buildings of its class in Canada. It is 432 feet long by 90 feet wide, with four stories and a basement. The columns and footings are designed to carry an additional story to be added at some future date, and extensions at either end of the building are also provided for. The board of directors of the company are D. Lorne McGibbon, Colonel S. P. Colt, Victor E. Mitchell, Elisha S. Williams, A. J. Kimmel, Homer E. Sawyer and T. H. Reider.

Garage Owners Elect Officers—The Chicago Garage Owners' Association, at its recent annual meeting elected the following officers: J. A. Cameron, president; H. J. Murphy, vice-president and chairman of the electric division of the association; W. C. Bode, vice-president and chairman of the gasoline garage division; Fred M. Johns, vice-president and chairman of the livery division; P. R. Higgenbothem, vice-president and chairman of the associate members division. John W. Morsbach was elected treasurer and H. S. Gilbert was re-elected secretary.

Falcon Makers to Move to Virginia—The sales and advertising departments of the Falcon Cyclecar Co. will move on January 15 from the Wright building, Cleveland, O., to Staunton, Va., where this company's new factory will be under production at that time. The consolidation of departments will expedite the distribution of demonstrators, announced for early in February. Francis R. Hoyt, consulting engineer, of Cleveland, has removed his offices from that city to Staunton, Va., in order to be in intimate touch with the early production of the Falcon cyclecar of which he is the designer.

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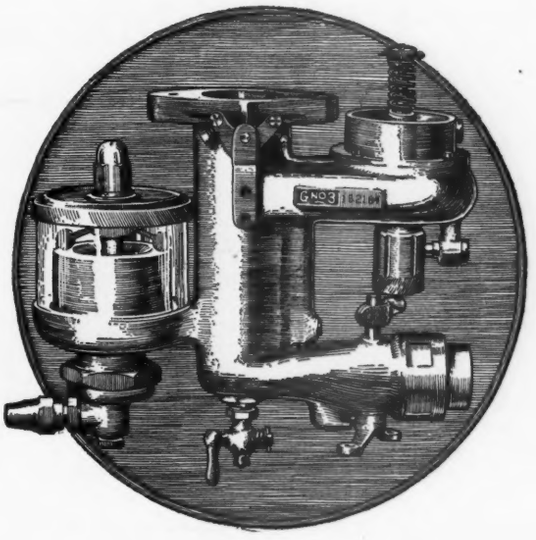
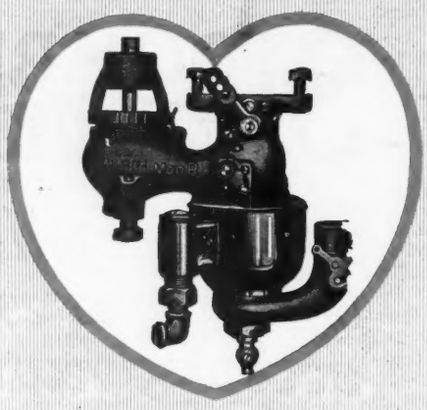


When Writing to Advertisers, Please Mention Motor Age.

SCHEBLER



Model R 1914

CARBURETOR

Correct in Principle
Simple of Adjustment
Automatic in Action

Sure Starting
Greater Power & Speed
Better Economy

Wheeler & Schebler · Indianapolis Ind ·

"Pioneers in Perfection of Carburetion"

BRANCHES:

Fry & McGill Motor Supply Co. Denver, Colo.	Wheeler & Schebler.....Chicago
Automobile Accessories Co...Pittsburgh, Pa.	Wheeler & Schebler.....Detroit
Ferris-Dunlap Auto Supply Co..Dallas, Tex.	Fred Campbell.....St. Louis, Mo.
Interstate Electric Co.....New Orleans, La.	W. J. Connell.....Boston, Mass.
Reinhard Bros. Co.....Minneapolis, Minn.	Equipment Co.....Kansas City, Mo.
Manufacturers' Supply Co Philadelphia, Pa.	Elyea-Austell Co.....Atlanta, Ga.
Weinstock-Nichols Co....Los Angeles, Cal.	J. C. Nichols.....New York City
Pennsylvania Rubber & Sup. Co..Cleveland	Weinstock-Nichols.....San Francisco

Fairbanks, Morse & Co., Ltd., London, England
Canadian Fairbanks-Morse Co. (All principal Canadian Cities)

To Agents of cars equipped with an "electric horn"—

When your customer comes back to you and says:

"My horn has gone to the bad. It won't work. I have got to have another. But not like this one. This time I want the best. Give me something that will stand up—"

That is the time you can sell him a Klaxon—easily.

The Klaxon is a permanent investment—guaranteed permanently. When a man buys a Klaxon that is the last cent he will have to spend for signal equipment—on his present car or on future cars. That is why its PRICE is more—but its COST less.

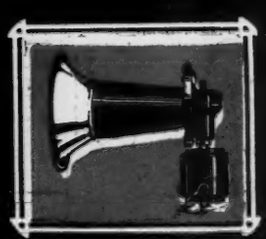
THE KLAXON is not an "electric horn." It is entirely different. Its principle is different. Its construction is different. Its note is different. This difference is the difference between temporary and permanent service—between a feeble, ineffectual "buzz" and a powerful, clean-cut WARNING.

KLAXONET

Lovell-McConnell Mfg Company Newark, N.J. U.S.A.

KLAXON

"The Public Safety Signal"



KLAXON

This advertisement planned, written and set up entirely in the Klaxon Factory. Type composition by the Klaxon Press with "Klaxon" type especially designed by Goudy.

THE new Adjustable Footlift (patents pending) is the master stroke in all automobile jack development. It is an exclusive feature of the 1914 line of

GENUINE DUFF-BUILT

BARRETT

AUTOMOBILE JACKS

No. 300 Patents Pending

No. 066

No. 345 Patents Pending

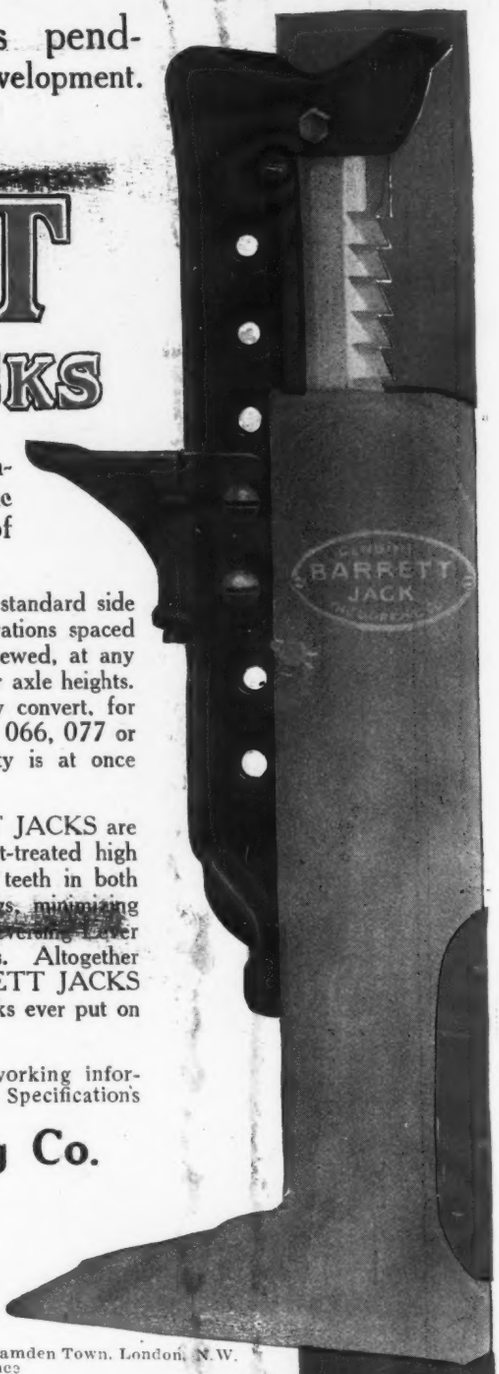
No. 06

DEALERS should immediately familiarize themselves with this new feature, as it multiplies the opportunities of making jack sales, without need of carrying more numbers.

Description: The adjustable footlift is combined with a standard side rack which is interchangeable. The side rack has perforations spaced one inch apart, into any two of which the toe can be screwed, at any desired height, to suit any difference between front and rear axle heights. The interchangeable feature enables the dealer to quickly convert, for instance, Nos. 06, 07 or 08 non-footlift jacks into Nos. 066, 077 or 088 footlift jacks; and so on. The increased salability is at once apparent.

Other features of the 1914 specifications for BARRETT JACKS are the highest grade malleable iron in Base and Lifts; heat-treated high carbon steels in Pawls, Gears and Pinions; machine-cut teeth in both Gears and Racks and machined pawl points and bearings, minimizing friction and eliminating the slipping of cogs; easy-acting Reversing Lever and a Tire Tool Lever for removal or replacement of tires. Altogether an assemblage of features that stamps the 1914 BARRETT JACKS as the most efficient and most serviceable Automobile Jacks ever put on the market.

Dealers should write at once for quotations and full working information on the Adjustable Footlift, together with full 1914 Specifications



The Duff Manufacturing Co.

PITTSBURGH, PA.

Established 1883

New York Office, 50 Church St.

Atlanta, Candler Bldg. **San Francisco, Monadnock Bldg.**

FOREIGN DISTRIBUTORS:

Great Britain—WHITE-COLEMAN MOTORS, LTD., Barlow St., Camden Town, London, N.W.
European Continent—ARMAND D. RIVIERE et CIE, Paris, France

No. 106 Design Pat'd and Other Patents Pending

No. 108 Design Pat'd and Other Patents Pending

No. 145 Design Pat'd and Other Patents Pending

"Just As Good"

has been painted on the outside of many articles, but something more than a paint brush is required to put them on a par with the leader.

The GLBA Storage Battery

TRADE MARK REGISTERED

was **never** in the "just-as-good" class. It was the **first** in the Electric Lighting and Starting field, as history proves.

Being the **first**, the GLBA had **ample opportunity** to **acquire**—and **profit** by—valuable, practical **experience** during its **spectacular rise** to the highest pinnacle of **popularity** in the automobile world.

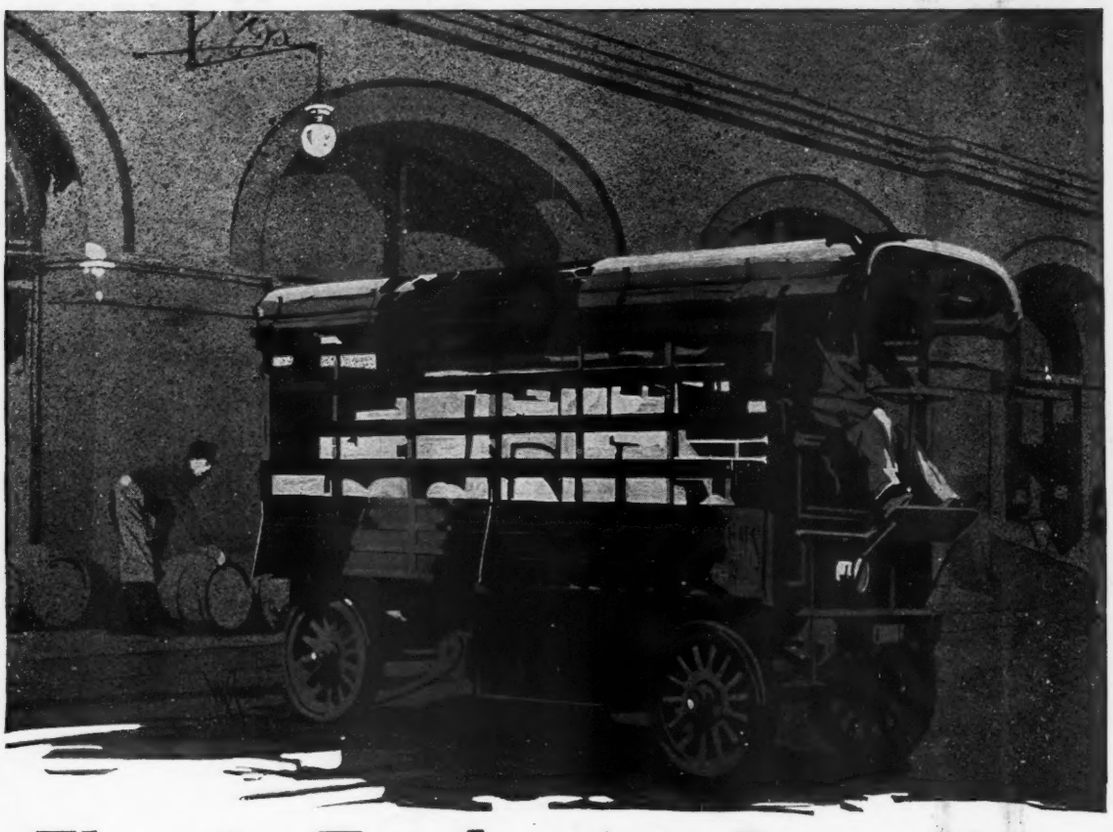
That's why GLBA batteries today are regarded as the **absolute standard**, while the others are still groping in the darkness of **experimentation**, seeking the **favor** of the automobile manufacturer by **claiming** they are "just-as-good" as the GLBA.

Five factory owned **Branches** and 150 **real service stations** in the U. S. and Canada afford **ample guarantee** of **efficiency** and **long life** to the GLBA. **What** do the "just-as-goods" offer you?

WILLARD STORAGE BATTERY CO., Cleveland, Ohio

New York Branch: 136 W. 52nd St.
Chicago Branch: 2241 Michigan Ave.
Detroit Branch: 1191 Woodward Ave.
San Francisco Branch: 243 Monadnock Bldg.
Indianapolis Branch: 438 and 439 Indiana Pythian Bldg.

SERVICE STATIONS IN ALL PRINCIPAL CITIES IN THE UNITED STATES, CANADA AND MEXICO.



Electric Trucks Are Increasing

In New York in one year the number of Electric Vehicles in use increased 45%. In Boston in the last two years the gain was 134%. In Chicago during the same period the increase is estimated at 400%.

In New Jersey in one year, one electric light company gained 67% in its revenue from charging Electric Vehicle batteries. In St. Louis during the first six months of 1912 one company showed a gain from the same source of 137%.

These figures are typical of the increasing use of Electric Vehicles throughout the United States. Here is indisputable proof that more and more forward-looking business men recognize the reliability, dependability and economy of Electric Commercial Vehicles for city haulage.

You really should investigate Electric Vehicles now.

Send For This Book Today

"The Story of the Electric Truck"

A most interesting representation of the facts and figures that you want to know about the Electric Truck. This beautifully printed book of 36 pages—yours on request. Cost of operation, etc.—actual photographs of the newest model Electric Trucks. Send for it today. Kindly ask for Booklet M

ELECTRIC VEHICLE ASSOCIATION OF AMERICA

Boston 124 W. 42d St., New York Chicago

78-b

Buick

Dealers Who Buy in Winter Are Sure of Profit in Rush Seasons

OUR factory and shipping records show that we have sold and delivered 25% more 1914 Buicks up to now than we did during the same period last year. And 1913 was our banner year. Our dealers know that in spite of our larger production we have so far been unable to supply their demands. Even with our increased output for 1914, it is certain that the same shortage will exist next spring that was experienced this last fall, when we were able to ship only about 50% of the orders tendered us.

It is absolutely impossible for the manufacturer of any well established line of automobiles to produce a sufficient number of cars during the months of August, September and October for the Fall trade or March, April and May for the Spring trade. These same manufacturers, however, can and do produce during January, February and March in excess of the demand.

If the dealer is to have the full worth of his automobile contract and get the returns which every automobile manufacturer desires his dealers to enjoy, then he must do as many successful dealers are doing—order cars shipped in January, February and March when they are available. Otherwise he cannot hope to care for the demand in the Spring—the season that returns to him his greatest profits.

Here are the Reasons for the Enormous Demand of Last Fall and the Certainty of Its Repeating Next Spring

The wonderful motor car values given in the 1914 Buick and the satisfaction already given one hundred and fifty thousand Buick owners created this amazing demand. And this demand for Buick cars was not established by chance but upon a continued adherence to a standard for high grade quality, demonstrated by years of service under all conditions.

The powerful Overhead Valve Buick Motor has always been reliable and has given faithful and sure service on roads of all kinds the world over. It may be relied upon to continue to do so, for the 1914 Buick represents our best efforts.

Buick cars sell because of these facts and the dealer who has fortified himself by putting in stock during the winter months, when they are available, sufficient cars to meet the demand that is sure to come, protects not only his own profits but his customers' interests as well.

That dealer who puts in a stock of Buick automobiles during the winter months is just as sure of a substantial dividend from his investment as we are sure that the demand for Buick cars is going to exceed the supply next spring—and be it remembered that a sale does not yield its profit nor satisfy the purchaser until the car is delivered.

There are some mighty good Auto Stories in our Bulletin No. 15. Send for it.

To Insure Deliveries Order Now.

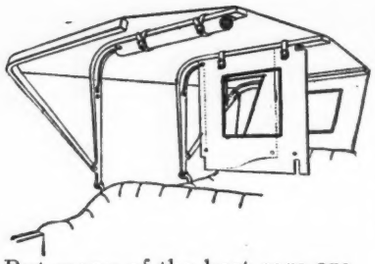
BUICK MOTOR COMPANY -:- FLINT, MICHIGAN

WHEN BETTER AUTOMOBILES ARE BUILT BUICK WILL BUILD THEM

The *right* curtain for the *right* place—always at your finger ends—with Collins Always-Ready Curtains. Put them up instantly from inside of car—without leaving your seat.

Don't stand in the mud with the rain pouring over you while the other occupants of the car hand you out one **wrong** curtain after another. This is such a gigantic improvement over the old method and so **simple** that you **wonder** why every car on the road isn't **already** equipped with

Collins Always Ready Curtains



But many of the best cars **are** already equipped. For instance, Collins Always-Ready Curtains are now standard equipment on the Cadillac, Chalmers, Haynes, Cole, Pullman, Havers, Herreshoff, Jeffrey, Lyons-Atlas, Apperson, Winton, Stearns-Knight, Moon, Velie, Davis, Speedwell, Jackson, Pratt, Palmer, Stanley and McFarlan. The judgment of **all** these manufacturers must be **right.**

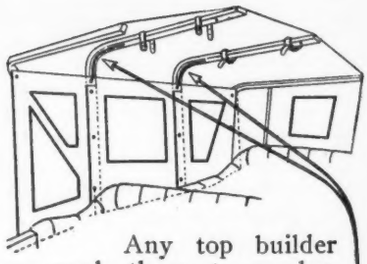
Collins Curtains are strapped, rolled up to the bows in the top of the car. Simply unbuckle the straps, slide the curtains down the curved bracket bar and clinch into place — the **right** curtain for the **right** place—every time.

With the old style curtains you never know what condition they are going to be in when you discommode the rear seat passengers to pull your curtains out from under the seat. Folded and packed tight you're almost sure to find broken or badly buckled celluloid lights. And dirty? —no name for it.

With Collins Always-Ready Curtains you know **in advance** that your curtains are going to be in perfect condition, because they are **always** neatly rolled in the place where they belong.

To Ford owners: We can now furnish Collins Always-Ready Curtains for Ford cars. We license top manufacturers to furnish Collins Always-Ready equipment with new tops or to equip old tops.

You can have Collins Always-Ready Curtains on your new car. You can have Collins Always-Ready Curtains on the car you are now driving.



Any top builder can apply them at a moderate charge, and the Collins attachment is applicable to any top and to your old style curtains.

There are some imitations and evasions of the Collins patent, which in some respects resemble Collins Curtains but they *do not* have *Collins* advantages. Look for the exclusive Collins *curved bracket bar* and the Collins license tag.

Be sure to see Collins Always-Ready Curtains at the New York, Chicago, Boston and Philadelphia Automobile Shows—or better still, write us today and we will tell you where you can see them now.

Novelty Leather Works Dept. B
Jackson, Michigan

Elyria-Dean
TRADE MARK

REXO II

$3.85

The Rexo II is the best and sturdiest warning signal that can be bought for less than Ten Dollars.

Its wonderful retail price is based on a production of 100,000 during the 1914 season. Sixty thousand have been contracted for as standard equipment by thirty motor car manufacturers.

REXO II's are in the hands of dealers ready for delivery. Look up one for your car.

REXO II Warning Signals are electrically operated.

Are of ELYRIA-DEAN quality.

Same high grade material and workmanship used as entered into the original Eight Dollar Rexo—more than 80,000 of them sold during 1913 season.

Operates on six volts.

One adjustment yearly the total care required.

Horn furnished in Black and Nickel or Black and Brass.

Finished with two coats of baked enamel (not air dried which chips) developed by years of study in the telephone business.

Six inch bell, quadruple plated.

Furnished in triple corrugated paper box, complete with cord, button and instruction book, ready for mailing or expressing.

Also Special FORD-REXO II—$3.85

See Your Dealer!

THE DEAN ELECTRIC CO.

2504 TAYLOR STREET ELYRIA, OHIO

See Elyria-Dean Products in
Spaces 69, 70 and 71, Third Floor, New York Automobile Show
Space 92, Coliseum Gallery, Chicago Automobile Show

New Departure Ball Bearings

American Made for American Trade

Like the Panama Canal, the New Departure ball bearing is the product of American experts.

The New Departure ball bearing was first offered to the trade something like six years ago, but the actual work of producing and perfecting this bearing started more than a decade back of that time when this Company began its experience in the manufacture of New Departure, anti-friction, ball bearing bicycle hubs.

The finesse of the art was reached when experts were employed to exhaustively study the manufacture of anti-friction bearings in all parts of the world. These men were instructed not only to learn what had been done, but to improve upon methods, processes, and results that marked the ultra attainments at that time. This work has absorbed a vast amount of investigation, investment, and invention, all and always with the American determination to excel.

Result—The ball type of bearing was selected because it more completely eliminates friction and, therefore, fulfills the purpose of an efficient bearing.

Result—Ten and a half acres of modern machinery, operated by 2,000 skilled artisans, producing 10,000 guaranteed ball bearings per day.

To quote an old axiom, "Nothing succeeds like success."

Literature on request. Co-operative engineering service for the asking.

The New Departure Mfg. Co.

Main Office and Works
BRISTOL, CONN.

Western Branch
1016-17 Ford Bldg.
DETROIT

The Magnetic Stewart Speedometer is the World's Standard

TODAY 95% of all the automobiles that are equipped with speedometers are equipped with *magnetic* speedometers.

The centrifugal principle, on which so many speedometers were once made, is now obsolete. The magnetic instrument has proved itself more accurate and more enduring—in every service, every climate and every country on earth.

Wherever you go in the whole world you will find the

Stewart Speedometer
MAGNETIC PRINCIPLE

More than one million Stewarts are now in use. This is more than have been made by all the other speedometer manufacturers combined. In making more speedometers than any one else we have naturally learned more about making them.

The Stewart is everywhere the accepted standard of precision and durability. Unlike the centrifugal type, it has no links, cams and springs to wear out and cause constantly greater inaccuracy. It has but one moving part, the magnet. The indicating disc is carried on jeweled bearings—like the bearings in your watch.

Whereas the centrifugal will not register speed until the automobile is traveling at five to ten miles per hour, the magnetic Stewart registers the slightest forward move. It shows speed from zero up.

Model B—$50

Stewart Speedometers and Stewart Service are available in every part of the world. You can find this most satisfactory instrument close at hand, and can also be sure that expert and willing attention to that instrument, and interest in its value to you, will follow you everywhere. Stewart service is famous for its efficiency and scope.

Equip your automobile with the magnetic Stewart Speedometer. For sale by dealers all over the world. You will be well repaid.

Stewart-Warner Speedometer Corporation

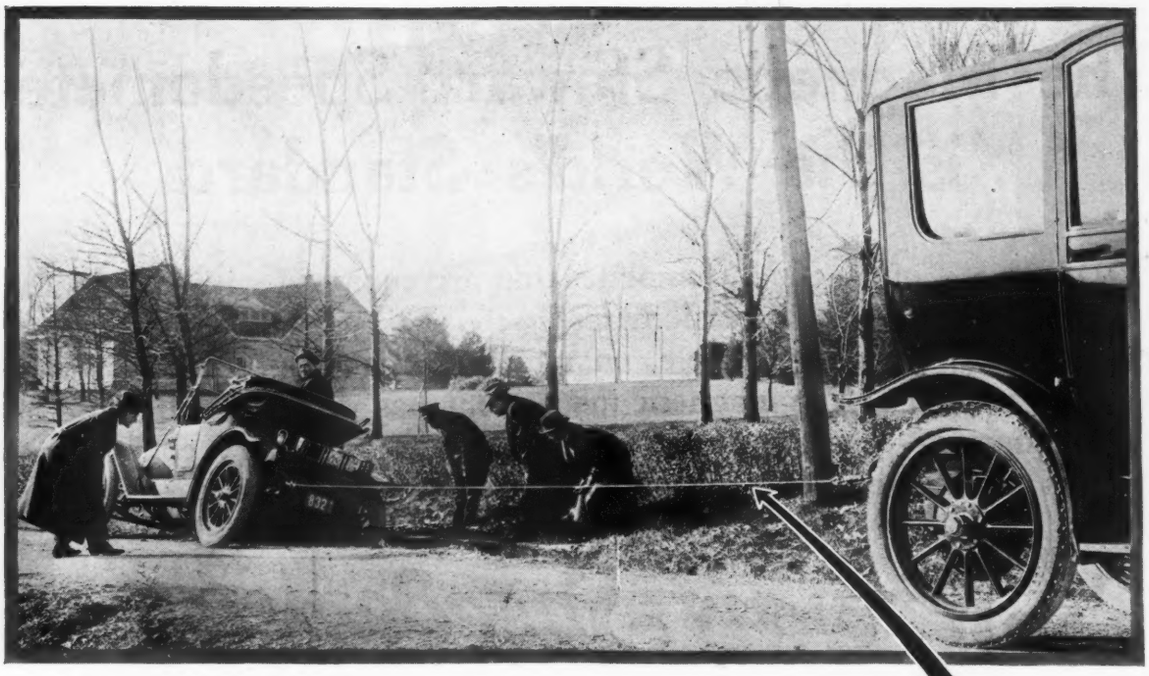
Factories: Chicago, Illinois and Beloit, Wisconsin, U. S. A.

Direct Factory Branches:

Atlanta, Ga. · *Boston, Mass.* · *Buffalo, N. Y.* · *Chicago, Ill.* · *Cleveland, Ohio* · *Detroit, Mich.* · *Indianapolis, Ind.* · *Kansas City, Mo.* · *Los Angeles, Cal.* · *Minneapolis, Minn.* · *New York, N. Y.* · *Philadelphia, Pa.* · *Pittsburgh, Pa.* · *St. Louis, Mo.* · *San Francisco, Cal.*

London, Eng. · *Paris, France.*

Nearly 100 Service Stations



Autowline on the Job

THIS actually happened recently, near St. Louis, Mo. The roadster ran into the ditch, just off the famously-good "Clayton Road." A Good Samaritan came along in his Limousine. He had a Basline Autowline under his driver's seat, ready for just such an emergency. In a few minutes the roadster was back on the road—its owner was saved a long wait, as well as a bill for a team of mules. It is needless to add that he bought an Autowline the next day.

Basline Autowline

"The Little Steel Rope With the Big Pull"

You need it in winter driving as well as in summer touring. You never know when or where you may get into road trouble. This safe, sure steel line is 25 feet of famous "Yellow Strand" wire rope. It weighs only 4½ pounds, but it can pull a 4,000-pound car up a 20 per cent grade. It takes up no room. You don't know it's in your car until you need it—then it always does its work. It is attached instantly by snaffle hooks. Two manila slings keep it from marring or scratching the paint.

Why buy so many other accessories and then overlook this absolute necessity that costs so little but brings you safety and peace of mind? Get Autowline now from your accessory dealer.

FREE Write today for the fully-illustrated Autowline circular.

Broderick & Bascom Rope Co.

Manufacturers of "Yellow Strand" Wire Rope

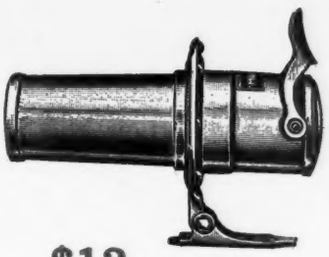
813 NO. SECOND STREET,
St. Louis, Mo.,

NEW YORK OFFICE
76 E. Warren Street

MOTOPHONE

Mechanically Operated

Five Types of Auto Horn Which Have Created the Greatest Sensation in Auto-Horn Industry



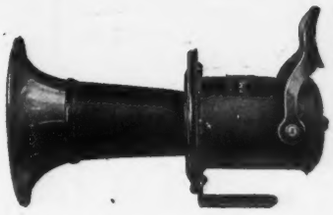
$12 Type A

HAND OPERATED

NO Adjustments Motor Troubles

NO Battery Expense Electric Wiring

Cable Attachment



$10 Type B

We are the largest Auto-Horn makers in the world. During the last eight years we have made and sold over 1,137,000 auto horns.

We are in a position to give Better Value for Less Money than any other horn maker in the world.

Liberal Discounts to Legitimate Jobbers.

Type D and E

The **Cable Attachment** of the Motophone has been devised and perfected to offer to the trade a mechanical horn having all the characteristics of motor driven (electrical) horns **without** the care of the electric motor, the cost of maintenance, adjustments and the numerous petty annoyances of which the user of the motor horn is subjected.

$10

Newtone Superior
(Motor Driven)

With Push Button and Cable, operated exactly the same as an electric horn and gives as loud a warning note. **Guaranteed for two years.**

Newtone Superior OUR $10 Motor Horn

Conceded by practically the entire industry as being the best electric horn made.

Type C for motorcycles has won instantaneous approval, a splendid warning signal for little money.

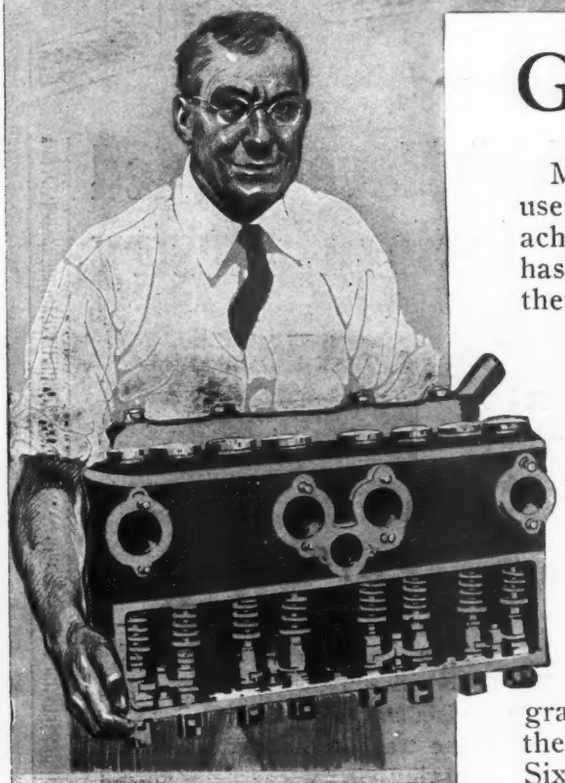
$8

Type C
For Motorcycles

Automobile Supply Manufacturing Company

220 Taaffe Place INCORPORATED 1904 **BROOKLYN, N. Y.**

"A Mechanical Masterpiece"



GLENN CURTISS, perhaps the greatest light-engine expert in the world, has just bought a Jeffery Six.

Mr. Curtiss knows what has been accomplished by the use of high-speed light motors. Some of his own greater achievements in aviation have taken place in Europe. He has had ample opportunity to observe the progress made there in light-motor construction. He has seen this idea replace all others in European automobile engine development.

So when Mr. Curtiss buys a Jeffery—the first American car to recognize and adopt the light, high-speed bloc-type motor—it is the endorsement of an expert. "The Jeffery," Mr. Curtiss says, "incorporates the latest European practice throughout."

He was one of the first to make inquiry about this remarkable car when the announcement was made. Then he took a demonstration and immediately sent the Thomas B. Jeffery Company a telegram. The text of this telegram is quoted complete on the opposite page under Mr. Curtiss' picture. His Jeffery Six was delivered to him on November 29, 1913.

The light, economical motor used on European cars has proved its correctness in millions of miles of continental running. The heavy motors of some American makers have demonstrated beyond doubt through their costly maintenance expense their unfitness for cars of moderate price. But these manufacturers cling to the use of the heavy type of motor.

They continue to use it because until now the American motor car buyer has not realized that motor power was not dependent upon motor bulk; and because their plants are equipped to build this type of motor.

We cheerfully acknowledge the supremacy of the light European motor—and we hasten to adopt that which means better service and greater satisfaction to the owners of Jeffery cars.

We are in business to produce the automobile that you want—and we have accomplished that in the Jeffery Four at $1550.

You demanded economy, speed, stamina, lightness and comfort. We built the Jeffery Four to that order. And believing in that business law which rewards the fit against the unfit, we feel sure that the Jeffery Four will

Specifications of Jeffery Four $1550

U-S-L starting and lighting, without chains, gears, bearings or belts. Left hand drive and center control.

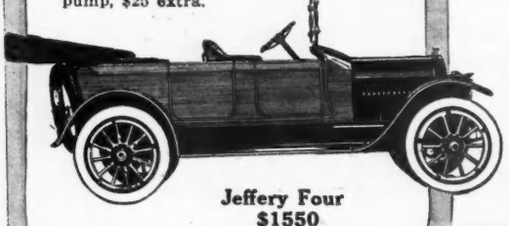
Imported annular ball bearings throughout; Spicer universal joints; combination force feed and splash oiling system. (Speed up to forty miles an hour, shut off your engine and coast half a mile.) Leather ring universal between clutch and transmission; four forward speed transmission—the lightest and easiest to operate.

High grade full floating type rear axle, on imported annular ball bearings—a delight to the motor wise. Vanadium steel rear axle drive shafts, front axles, springs and steering knuckles.

Bosch duplex ignition; Rayfield carburetor; pressure feed gasoline tank with gauges on tank and dash; demountable rim; advanced type of body designed by Rothschild.

Jeffery Four equipment includes Neverleak top; top cover; rain vision wind shield; electric lighted dash with Stewart-Warner speedometer, ammeter, air and oil pressure gauges, four position light switch and small storage compartments; Klaxet horn; foot rest; extra demountable rim with carrier, and complete tool and tire equipment.

Engine driven power tire pump, $25 extra.



Jeffery Four $1550

The Thomas B. Jeffery Company
Jeffery
Kenosha, Wis. U.S.A.

says Glenn Curtiss

in a very short time supplant a great many of the heavy American models.

Already we have sold hundreds of cars to men who could pay more, but who found they could not buy better.

They had declared themselves for flexibility. Jeffery gave them a car that would make 40 miles an hour within 20 seconds, from a standing start.

They had declared themselves for lightness. Jeffery produced a car that weighs but 2870 pounds.

They had declared themselves for power. Jeffery offered a light, fast motor that develops 42 horsepower.

They asked economy. Jeffery motors are high efficiency motors; burning little gas; burning it completely, quickly and economically.

Jeffery lightness (2870 pounds) means a long life to tires; often six or eight thousand miles per set.

A Jeffery horsepower has to pull but 60 pounds of car —other motors have to pull from 80 to 100.

And above all, the discriminating buyer who has owned other cars, and had discovered the sacrifices necessary to low price, demanded comfort.

"It can't be done" said Jeffery dealers.

"It is impossible," said the very owners whose specifications we set out to incorporate.

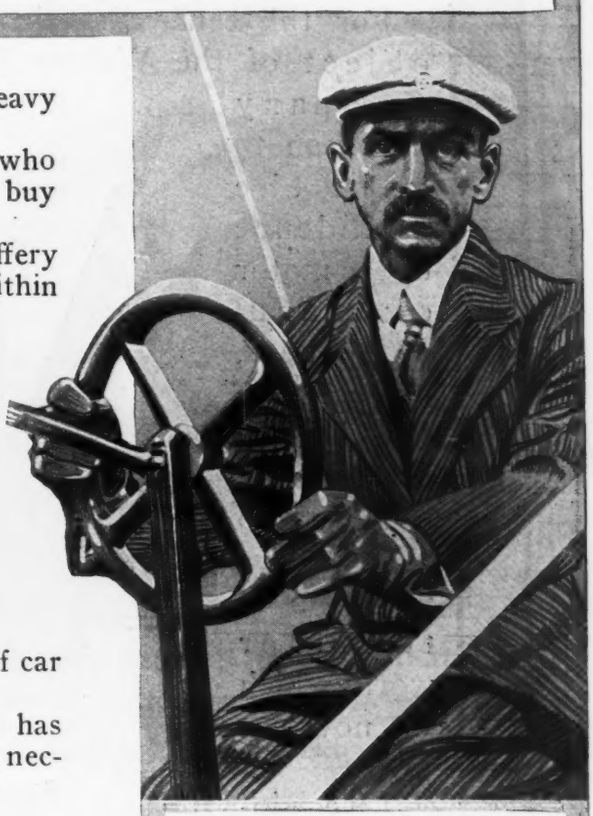
Jeffery Did It.

And because he proved that we had met every demand for lightness, speed, power, economy and comfort, the result is mighty gratifying to us.

The best dealers everywhere in the country are organizing new companies and dropping other lines to sell this car, and the motor car buying public who have been paying much more for big, heavy uneconomical cars, and much less for cheap, uncomfortable cars, are driving Jeffery cars this season.

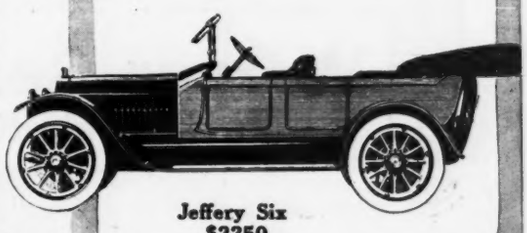
The Jeffery Six is a duplicate of the wonderful Jeffery Four, except for size. The cylinders are cast in pairs. This car, which sells at $2,250, is in a great many ways as remarkable among Sixes as its smaller brother is among the Fours. We built it for those who will drive nothing but a Jeffery car, but who prefer a Six. It is light—actual scale weight, 3570 pounds, with full equipment. We made it luxurious and beautiful without making it extravagant. We know that a better Six cannot be built. The motor—3¾ x 5¼—develops 48 horse power. The bearings are imported annular ball throughout. The ignition is Bosch Duplex and the starting and lighting system is the U-S-L of course. Wheel base, 128 inches, and wheels 36 x 4½—on enclosed cars 37 x 5—full floating rear axle, Rayfield carburetor, Warner autometer, ammeter, engine driven power tire pump, Rothschild body with extra wide doors and low, deep seats. This car is made with five passenger touring or two passenger roadster body at $2250; six passenger at $2300; Sedan, five passenger, $3250, and Limousine, at $3700.

The Thomas B. Jeffery Company
Main Office and Works, Kenosha, Wisconsin



Glenn Curtiss Says:

"I have been running the new Jeffery Six and I am glad to report to you that the car is as good as it looks and a mechanical masterpiece. The machine is up-to-date in every respect and incorporates the latest European practice throughout. It has plenty of power and speed and is easy riding and very easy to handle. The engine is quiet and pulls exceptionally well on direct drive at slow speeds. I wish to thank you for your prompt delivery and courteous treatment."



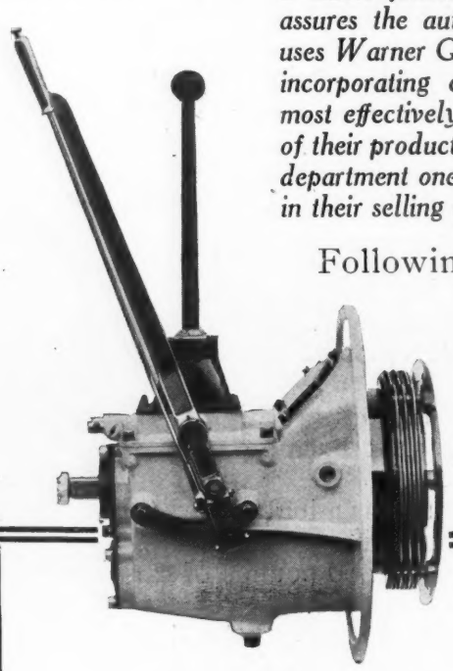
Jeffery Six
$2250

1901—"Warner Gears—Standard For Years"—1914

For thirteen years the one object of the Warner Gear Company has been to gain the confidence of the motor car manufacturers, and we have in this time constantly striven to merit the position in the motor world which we now enjoy.

The pioneer automobile gear builders with their product spoken of sally pro- and univerclaimed—"THE RECOGNIZED STANDARD."

"Precision, accuracy, engineering skill, mechanical ability, supremacy of all materials used, combined with modern factory methods and shop practice, and backed by a stable financial organization, absolutely assures the automobile manufacturer who uses Warner Gear assemblies that they are incorporating constructions that will add most effectively to the merit and efficiency of their product, as well as giving their sales department one of the most valuable assets in their selling argument.



Announcement

The transmission shown above, "Model T-38," is the smallest unit type that has as yet been manufactured.

It has been designed and built to fulfill the call and demand for a small unit type transmission, especially adaptable to light four and six cylinder motors, rated from 20 to 30 H. P. It can be furnished with two standard flange dimensions, and is particularly adapted to the recent addition to the Continental line of motors, namely, their model "N" types. This transmission is furnished complete with controls and clutch and in this connection quantity orders on the above type warrant the customer's option of either disc or cone clutch.

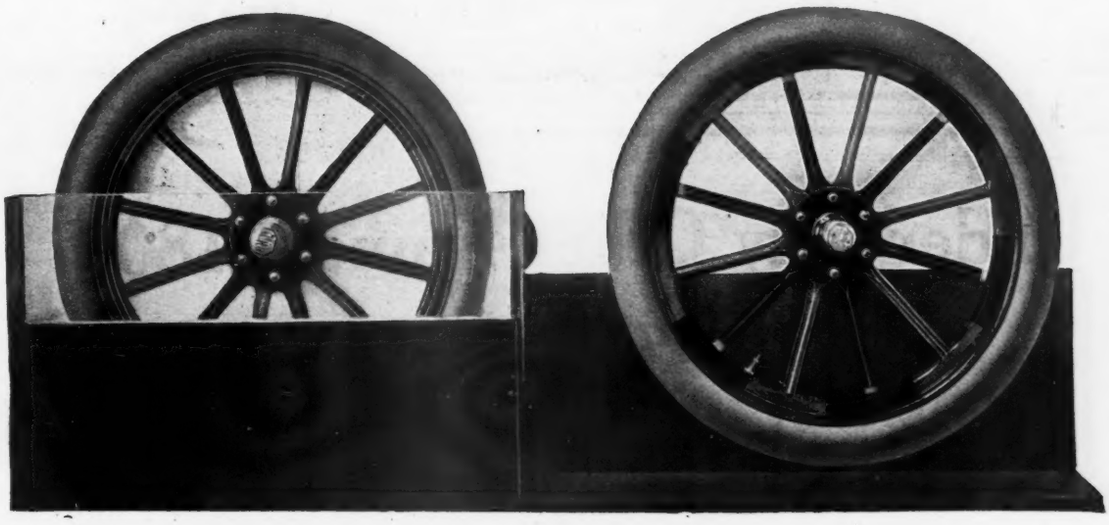
Following our established policy of embodying in each ensuing design the mechanical features which have characterized our product in past years, and incorporating in our new designs any new constructions that are noteworthy, and of mechanical advantage, we issue with each assembly shipped our absolute guarantee as to its individual **dependability.**

Warner Gear Co., Muncie, Ind.

Detroit Office—628 Ford Bldg.

The Varnish That Defies Soap

See it at the Automobile Show



Look for the wheel revolving in the soapy water at our Booth
at the Automobile Show, Grand Central Palace, New York.

It is a startling demonstration of our Vanadium Chassis Finishing, a varnish which is absolutely unharmed by the caustic action of automobile soap.

Six of the spokes of the wheel are finished with the best automobile gear varnishes heretofore made. They cannot withstand soap, and turn gray and lose their lustre. The other six spokes are finished with

Valentine's Vanadium Chassis Finishing

These spokes stand up absolutely unharmed after weeks of exposure to soap and water. This is the varnish for the hood, fenders, and underparts of your car. It resists mud, road oil, grease, and the heat from the motor as well as it resists soapy water. It will keep the finish of these parts of your car in perfect condition many months after the ordinary varnish would be destroyed.

You will be interested in a new booklet we are issuing, "The Care of the Car." It tells all about how to preserve the finish of the car, and will, we are sure, prove of value to you. It describes Vanadium Chassis Finishing. We should like to send it to you, free of charge of course. Just fill out the coupon.

A feature of our exhibit at the Show this year will be a novel representation of automobile bodies in various colors.

Valentine & Company

343 S. Dearborn Street
Chicago

456 Fourth Avenue
New York

74 Pearl Street
Boston

TRADE VALENTINES VARNISH MARK

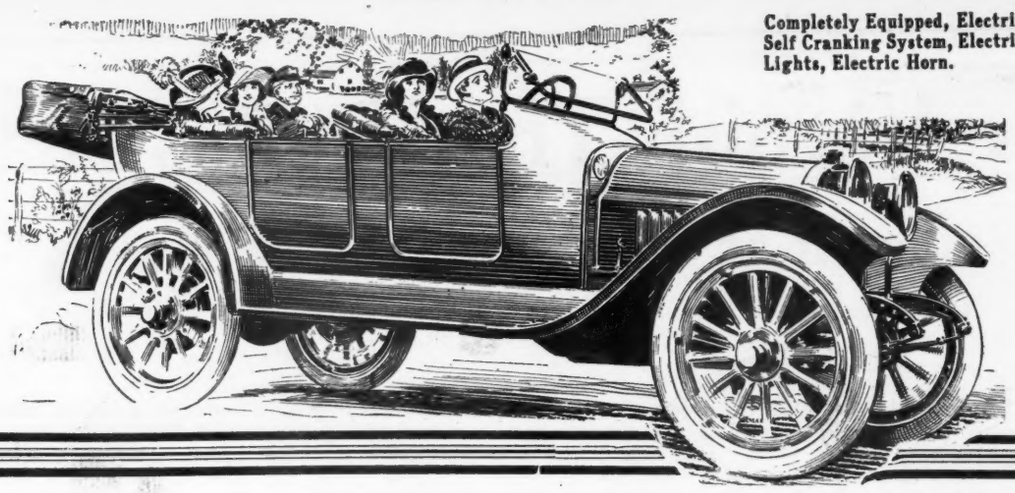
FILL IN—TEAR OFF—MAIL TODAY

Valentine & Company, 456 Fourth Ave., N. Y. C.

Name ..... M.A.V.C.

Address .....

Please send me copy of your booklet "The Care of the Cars."



Completely Equipped, Electric Self Cranking System, Electric Lights, Electric Horn. **$1490**

Under Any Other Name, $1800

See It at the Shows

UNDER any other name than *Auburn*, the car shown above—40 horsepower, 120-inch wheelbase, electric starter, electric lights and complete equipment—*actually does cost from $1800 to $2000!* But this year we have sprung a *value sensation.* That car, at $1490 is the

New Auburn "40"

It is a big, beautiful car of European "stream" lines—the body design constitutes the blended ideas used for 1914 by two famous European cars.

Left Drive—Center Control
Fully Equipped—No Extras

THE car lacks nothing that a very high priced car can give. It has left drive, center control, electric self-cranking system, electric horn—everything. Note these advancements, at $1490:

Rain-Vision Ventilating Windshield
36 x 4 Tires; Demountable Rims
Full Floating Rear Axle
Cowl Dash
Turkish Type Upholstery — Finest of Leathers
Wide Doors (with Concealed Hinges) as on 1914 European Cars
Dustproof En Bloc T-Head Motor; Automatic Primer
Extra Roomy Tonneau—29 Inches Foot Room
Tire Irons with Extra Demountable Rim

Now on Exhibit

Models: "40"—5-passenger, $1490; 6-passenger, $1590; "45" — (6-cylinder) 5-passenger, $2000; 6-passenger, $2100 (all fully equipped).

Go see this car at our dealers' show rooms and at the Auto Shows. The visit will show you the startling motor car value of 1914. Then gauge all cars you are considering by this new standard of value.

And write today for the new catalog, just out.

Auburn Automobile Co., Auburn, Ind.

19A

MERZ

JENKINS

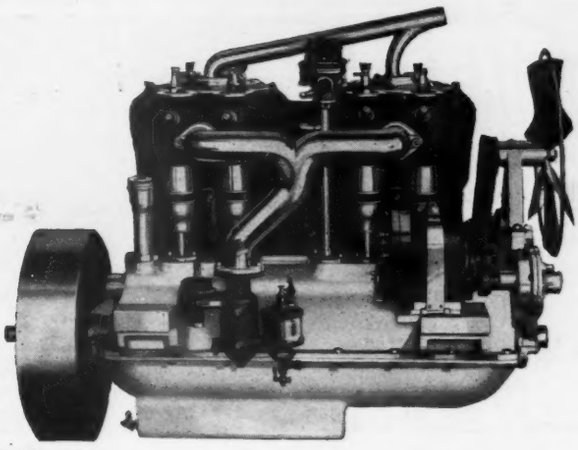
DISBROW

HERR

KNIPPER

HUGHES

COOPER



Wisconsin Motor

CONSISTENT

Leads the Field

If tests are proof, the performances of Wisconsin Motors during the last season speak for themselves. At Corona, Earl Cooper, driving a Stutz car equipped with the consistent, long-stroke Wisconsin Motor, made a world's record, driving 301.81 miles in 4 hours, 2 minutes, 38 seconds—without even raising the hood.

Bob Burman led the field at the Indianapolis Speedway Race for 150 miles when his carburetor caught fire. Gil Anderson then was the leader until a slight misfortune put him out with only a few laps to go. Chas. Merz finished third with his car afire. The splendid record of these men was made possible by consistent, reliable, powerful Wisconsin Motors. That this motor is always a strong contender for international honors is shown by the following records made this season by cars equipped with it.

The Roll of Honor

Date	Race	Place	Distance	M. P. H.	No. of Starters	Car	Driver	Position
Mar. 2	Free for All	San Diego, Cal.	200 M.	59.00	6	Stutz	Cooper	2nd
July 5	Int. City Race	Tacoma, Wash.	102 M.	65.17	8	Stutz	Parsons	1st
July 5	Int. City Race	Tacoma, Wash.	102 M.	63.87	8	Stutz	Cameron	2nd
July 7	Potlatch Trophy	Tacoma, Wash.	200 M.	71.07	7	Stutz	Cooper	1st
July 7	Potlatch Trophy	Tacoma, Wash.	200 M.	63.15	7	Keeton	Burman	2nd
July 7	Monta Marathon	Tacoma, Wash.	250 M.	70.71	10	Stutz	Cooper	1st
July 7	Monta Marathon	Tacoma, Wash.	250 M.	68.28	10	Tulsa	Hughes	3rd
Aug. 9	Free for All	S. Monica, Cal.	445 M.	73.77	14	Stutz	Cooper	1st
Aug.31	Elgin National	Elgin, Ill.	301 M.	71.5	12	Stutz	Anderson	1st
Sept. 4	Free for All	Corona, Cal.	301 M.	74.63	9	Stutz	Cooper	1st
Sept. 4	Medium Car	Corona, Cal.	251 M.	75.03	6	Stutz	Cooper	(*)

(*) World's record.

Feb. 10th, Cooper, driving against time in a Stutz car, established a world's record for 200 miles on a dirt track, doing the distance in 3 hours, 27½ minutes.

Wisconsin Motors have won many other events of both great and minor importance. Testimony of their absolute reliability and correct mechanical construction is offered by America's foremost track drivers, a few of whose faces are presented on the margin herewith. Each one of them is a Wisconsin Motor enthusiast.

Write for Catalogue Today

Wisconsin Motor Mfg. Company, Dept. 30 Milwaukee, Wis.

KERN

PARSONS

LEWIS

CLARK

ANDERSON

CHANDLER

BURMAN

ENDICOTT

NIKRENT

GRANT

America's One Distinctive Motor Car

The new "Six-48" Keeton is the most distinctive Motor Car made in America. It ranks with the finest products of Europe in design, construction and finish. No detail has been overlooked that contributes to appearance, comfort, practicability, use and endurance.

Yet the Keeton is manufactured in the economical American way and costs you about one-half the price of the imported car of its class.

It is the one American made car that stands forth from the general run — distinctive in its quiet elegance of finish, harmony of line and wealth of detail.

A limited number of these splendid cars will be built for the coming season and it will be greatly to your advantage to communicate with us at once.

KEETON SPECIFICATIONS

Motor—Six Cylinder, 4" bore, 5" stroke, cast en bloc, "L" head.

Ignition—Eisemann Dual High Tension Magneto, Automatic, Spark Advance.

Electric Starting Lighting—"Jesco" Starting and Lighting System, single unit type.

Cooling — Centrifugal Pump and powerful flywheel fan insure ample cooling.

Front Axle—Elliott type, ball thrust bearing in yoke head.

Rear Axle—Full floating type, gear ratio 3¾" to one. Imported annular bearings.

Brakes—Brakes cam actuated, internal expanding, large diameter.

Control—Left side drive, right-hand control.

Steering—Worm and full Gear Type with thrust bearings, 18" or 20" walnut wheel.

Clutch—Cone shaped steel discs running in oil housed in flywheel.

Transmission—Selective type, 4 speeds forward and reverse, direct on third, imported annular bearings.

Wheels—Five interchangeable wire wheels 34" in diameter, 4½" tires.

Speedometer—Warner Autometer with clock combination.

Horn—Large Klaxon.

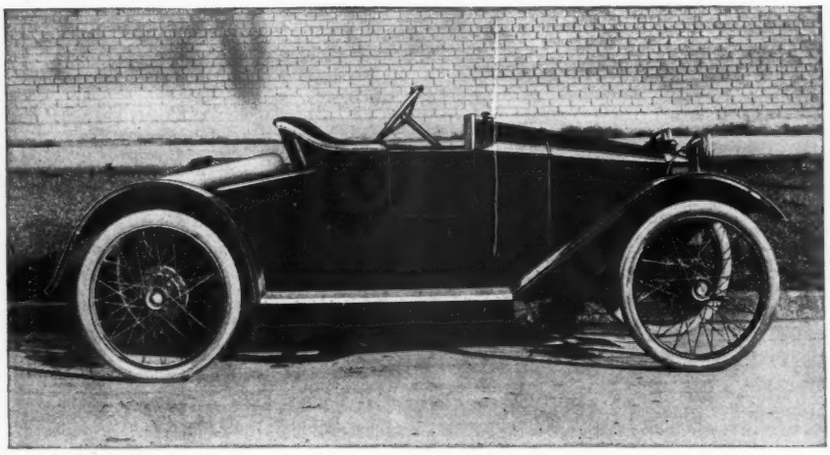
Air Pump—Mechanically operated, two cylinder compressor.

Wheel Base—136".

PRICES—F. O. B. DETROIT.

2 Pass. Roadster, completely equipped..$3250
7 Pass. Touring Car, completely equipped 3250

A full line of open and closed bodies.



$495 2-Passenger "CAR-NATION" Roadster $495

"CAR-NATION"

The Car for the American Public

More than a Cyclecar

The "Car-Nation" is just what the name implies—The Car for the American Public—having the appearance and mechanical "get up" of cars costing three times as much, yet the running and upkeep expense is reduced to a minimum — 25-30 miles to the gallon of gasoline.

Every part that enters into the construction of the "Car-Nation" is identically the same as has been used in some well known car costing $1000 and over.

This means a long and economical life — as these parts are standard and will give exceptional service.

Then again the appearance of the car attracts attention — the V-shaped radiator, tapered hood and cowl, stream line body and wire wheels—all combine to make it a class proposition.

DEALERS — These snappy little cars are selling fast and you will certainly miss a great opportunity if you do not get in touch with us about this thoroughly proven and tested Car-Nation.

CAR-NATION SPECIFICATIONS.

Unit Power Plant—Motor—4 cyl., en bloc, 3⅜x3¾, "L" head—large valves and bearings. Very quiet and powerful.

Ignition—Magneto—Fixed spark.

Lubrication—Constant level splash—plunger pump.

Carburetor—Approved type—very economical.

Cooling—Thermo syphon. V-shaped radiator—adjustable belt-driven fan.

Clutch—Multiple steel disk type running in oil.

Transmission—Selective type, 3 speeds forward and reverse—one lever control.

Drive—Bevel gear through concentric torque tube with one universal joint.

Rear Axle—Semi-floating type, Hyatt roller bearings.

Brakes—Emergency, internal exp. on 10" drum on rear wheels. Service external contracting on transmission shaft.

Wheels — Detachable wire — 30x3" clincher rims and smooth tread tires.

Control—L. H. drive, center control.

Wheelbase—104".

Tread—48".

Standard equipment—Oil head lamps and tail lamps with set of tools.

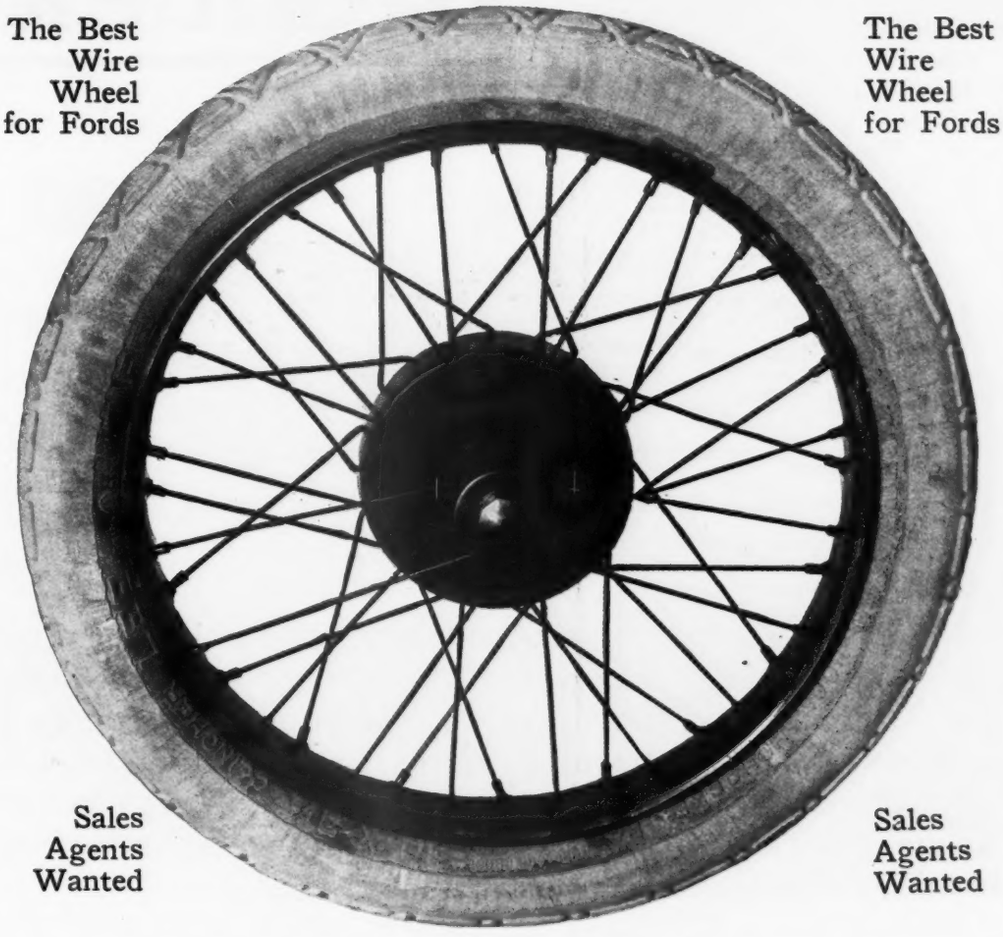
PRICES

Model A—2 Pass. Roadster.....$495
Model B—2 Pass. Tandem Type..... 510
Model C—4 Pass. Touring Car..... 520
Extra Equipment: Top, $25; Windshield, $10

Manufactured by **KEETON MOTOR CO., Detroit, U. S. A.** **See our Exhibits at NEW YORK and CHICAGO**

FORD INDESTRUCTIBLE -WIRE- WHEELS

The Best Wire Wheel for Fords



The Best Wire Wheel for Fords

Sales Agents Wanted

Sales Agents Wanted

Read carefully the Specifications of this new wire wheel, which has been designed to supply the tremendous demand for wire wheels on Ford and other small cars.

SPECIFICATIONS

Swedge spokes — steel stamped housing — universal steel rim — size for 30 x 3½" tire — baked enamel finish — nickel hubcap — adjustable spokes — now manufactured at rate of 12,000 sets per month — Immediate supply of your demands.

REPRESENTATIVES WANTED

We want to get in touch immediately with representatives handling Ford equipments in cities and towns. We have a good proposition to offer.

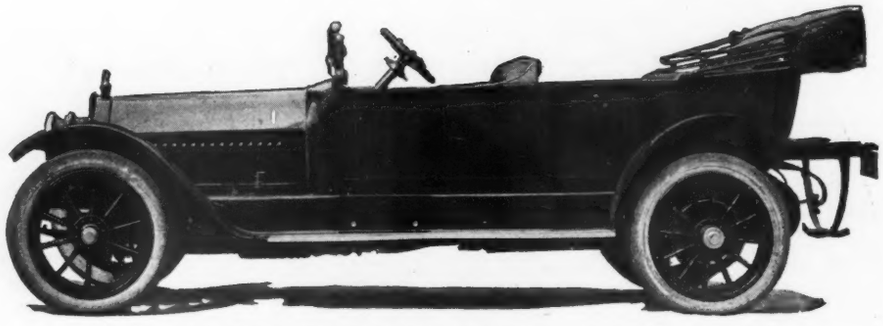
Write for illustration and prices, showing the Ford Cars equipped with wheels.

GEO. E. GOBLE & CO. *Sole Distributors*

682 Woodward Ave. - - - - - - - DETROIT, MICH.

Once More the Stearns-K

BIG Feature o



Stearns-Knight Six-Cylinder Six-Passenger Touring Car

THE new four- and six-passenger Stearns-Knight Touring Cars, which will be exhibited at the Shows for the first time this season, differ so radically from ordinary standards of body design and treatment as to constitute an entirely new type. Not since Stearns brought out the famous Guy Vaughan, or Toy Tonneau model in 1907 has a body type been so extensively copied as this new type will be during the next year.

In the lines of the bodies themselves—in upholstery, trimming and detail refinements—these cars show what can be accomplished when master designers depart from the beaten path. The instantaneous success of the new models indicates the widespread demand for a body design which would combine individuality in the treatment of details with perfect harmony of the whole.

The F. B. Stearns Comp

Knight Furnishes the of the Shows

Their many distinctive features—the leather-covered cowl-back of the front seats, emphasizing the straight sweep of the body lines—the low, rounded arm-rests—the absence of projecting upholstery—the new type of disappearing auxiliary seat used in the six-passenger model—the one-man top—and many other details make these cars exceptionally attractive and convenient. Mounted on the standard Stearns-Knight chassis—either four- or six-cylinder—they embody the highest developments of motor car construction.

Nothing else at the Shows will equal these new cars in interesting features. Be sure to see them at the Stearns exhibits.

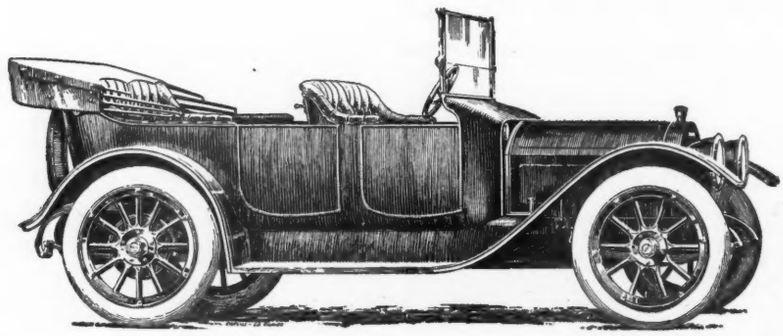
Interior of Stearns-Knight Four-Passenger Model, showing type of upholstery used in both Four- and Six-Passenger Cars

The new Stearns-Knight Coupe and Sedan models will also be exhibited for the first time at this year's Shows. Combining exceptionally attractive lines with the unsurpassed Stearns finish and appointments and the silent, efficient Stearns-Knight chassis, they form a notable addition to the Stearns-Knight line of luxurious closed cars.

pany, Cleveland, Ohio

Velie

America Follows Europe Returns to "Fours"



This Velie Four Will Displace Any Six

(At a Much Lower Cost for Maintenance)

ALREADY the average owner is tired of the excessive fuel and tire cost of the heavy "Six," and Europe, the Dictator of Automobile Practice, has come back to the economical "Four." There only the light "Six" survives—the new highly developed "Four" is supreme. In this country the type of car now supreme in Europe (the Velie 4-45) leads the way. Advance orders for this remarkable car are 300 per cent. greater than last year—in the face of the tremendous shout for "Sixes" made by so many manufacturers.

The Three Great Velie Models

Model 10 (The Light) Velie Six. Cylinders cast in triplets, bore 3¾ inches, stroke 5¼ inches, wheelbase 126 inches. Tires 37 x 4½ inches front and rear. Transmission, four speeds forward and one reverse. Selective sliding. Lubrication, constant level circulating system. Built as 5-passenger touring car, 4-passenger torpedo, 2 passenger roadster. Price.... $2,350

Model 9 The famous Velie "4-45." Cylinders cast in pairs, bore 4⅝ inches, stroke 5¼ inches. Wheelbase 121 inches. Tires 36 x 4 inches front and rear. Transmission, four speeds forward and one reverse. Selective sliding. Lubrication, constant level circulating system. Built as a 5-passenger touring car, 4-passenger torpedo, 2 passenger roadster. Price..... $2,000

Model 5 "4-35." Cylinders cast en bloc, bore 4 inches, stroke 5½ inches. Wheelbase 113 inches. Tires 34 x 4 inches front and rear. Transmission, three speeds forward and one reverse. Lubrication, constant level circulating system. Built as a 5-passenger touring. Price $1,500

THIS REMARKABLE EQUIPMENT STANDARD ON ALL VELIE MODELS

Gray & Davis Electric Starter.
Gray & Davis Electric Lighting.
Goodyear No-Rim-Cut Tires.
Demountable Rims, with extra rim carried at the rear.
Concealed Electric Horn.
Bosch Magneto Dual Ignition.
Stromberg High-Efficiency Carburetor.
Mohair Top and Ventilating Rain Vision Windshield.
Left Steer with Center Control.
Extra Long Springs, 2½ inches wide.
Deep upholstery with best leather used throughout.
Warner Auto-Meter.

Every Velie Dealer *is backed up by our great financial and manufacturing responsibility and his word is the voice of the Velie Motor Vehicle Company.*

VELIE MOTOR VEHICLE COMPANY 1002 Velie Place Moline, Ill.

Velie

Which Truck Is Best of the Famous Big Four?

MERCHANTS who have bought dozens of trucks now narrow their orders down to four great makes of rival motor trucks, each backed by millions of resources. All four of these makers are in the business to stay. Among them competition is keen.

The aggregate resources of these four competing makers is over $25,000,000. Each of these great organizations stands squarely back of every truck it builds and makes good its guarantees to the letter, giving service that cannot be secured from smaller concerns.

Almost daily keenly competitive tests between these four great makes of trucks are establishing which is the best. For the four are in use by the largest corporations who use trucks by the dozen.

In pulling power the Velie Truck, the only one of the big four unadvertised until now, is proving that a more powerful, slower running motor will in competitive tests out-pull and out-wear all high-speed, quick-wear, small-powered motors.

For this reason the Velie One-Ton Truck carries a motor 25% more powerful, possibly, than any other truck made. But this extra horsepower means a much greater service ratio, more miles per gallon of gasoline.

In Frame Construction all four makes have 5 or 6-inch frames—some channel shaped, others I-beam. But the Velie in addition to having a 6-inch I-beam frame has a 4-inch sub-frame that is not found on any other truck. And in heavy hauling this extra sub-frame proves its wonderful worth.

Experienced buyers can tell by comparison of specifications why it is that the Velie is winning the fiercely competitive tests between the four best makes of trucks.

Any Velie agent has these truck contest results on file—they are convincing—ask to see them.

VELIE MOTOR VEHICLE COMPANY 1002 Velie Place **Moline, Ill.**

The Atwater Kent Ignition System

How would you like a carburetor that had to be adjusted from the steering wheel, half a dozen times in a mile, under penalty of doubling your fuel consumption and trebling the soot deposits on the pistons?

How would you like to juggle the "carburetor lever" every time you changed gears, or halted for traffic, or opened up on a level stretch, or rushed a hill?

Possibly you like to "play" with the controls of your car; but there is such a thing as being so blamed busy with controls that you don't have time to notice whether you are in Schodack Centre or Genesee, or whether you brought your passenger along or left her behind.

The chances are that that sort of gasoline dispenser would last about one minute after you could put yourself in possession of a modern automatic carburetor.

And yet the chances are that you are monkeying with your spark lever just as diligently as you thank the patron genius of motordom that you *don't* have to monkey with the carburetor.

Curious, isn't it?

No. To be fair, it is only natural—the result of inventive effort having been applied to the carburetors first. We demand automatic carburetion because we can get it and all our neighbors have it.

But the automatic spark control comes next!

It is already here for some of us. In another year it will be practically universal, and the pleasure of motoring will be broadened and heightened by it.

You can have automatic spark control on your own car!

If you are buying a new machine, you only need to specify the Atwater Kent Ignition System, Type K, and it will cost no more than the hand-regulated magneto it displaces. It may even cost less.

If you are keeping your present car, the Atwater Kent Type K can in all probability be applied to it, at a cost less than that of a high-grade magneto. And it will give you a quality of service far beyond anything purchasable in a magneto at nearly equal outlay.

We haven't room for details here. Probably the Atwater Kent System, in its earlier forms, is known to you by reputation at least, for it has been making a splendid record ever since 1905 for efficiency, consistent service, and economy. We will gladly send you, on request, Circular A, containing full description and prices.

See us at the Shows

New York Booth C. 87

Chicago Booth 8

ATWATER KENT MFG. WORKS

4934 Stenton Avenue **Philadelphia, Pa.**

There is satisfaction in the ownership of a KisselKar

YOU'LL be proud to own a KisselKar—and your pride is justified in the knowledge that it is an automobile of consistent performance. Every tried and tested feature in automobile construction is embodied in it. The stand-up records of the thousands of KisselKars in use is a striking demonstration of what can be accomplished by the right application of mechanics and skillful workmanship.

KISSELKAR

In appearance, comfort, silence and ability the KisselKar is unsurpassed—in innumerable details and refinements it is an immeasurably superior automobile. The liberal wheelbase, emphasizing the long low effect of the body and unusually roomy tonneau and deep seats, give the KisselKar a distinction not surpassed even by the highest priced automobiles.

The KisselKar Catalog describes and illustrates the three models; 60 "Six" at $3150; 48 "Six" $2350; 40 "Four" $1850. Eleven types of bodies. All fully equipped, electric lighted and started, left hand drive, center control. If you are interested, write for this catalog.

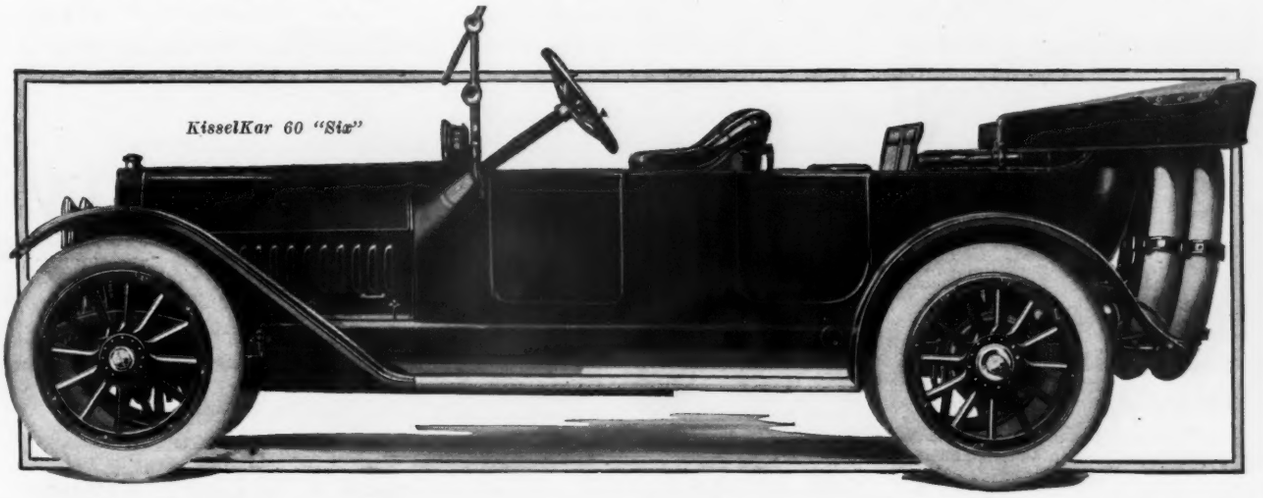
Service Contract

The KisselKar is sold under a written guarantee of service to owners—a definite contract that plainly stipulates the scope of KisselKar service. The unusual facilities at the KisselKar Service Stations, at all principal points, are always at the disposal of owners of KisselKars and KisselKar Trucks.

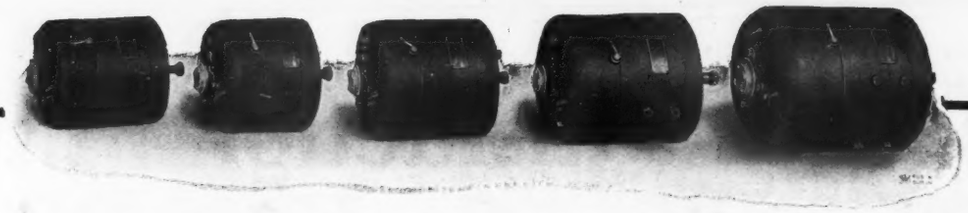
KisselKar Trucks—six sizes—1500 lbs. 1—1½—2½—3½—6 tons. Big illustrated portfolio sent on request.

Kissel Motor Car Company, 121 Kissel Ave., Hartford, Wis.

BOSTON, NEW YORK, CHICAGO, MILWAUKEE, KANSAS CITY, MINNEAPOLIS, ST. PAUL, DALLAS, SAN FRANCISCO, LOS ANGELES, OAKLAND, Philadelphia, Detroit, Houston, El Paso, New Orleans, Washington, Baltimore, Nashville, Duluth, Buffalo, Pittsburgh, Hartford, Conn.; New Haven, Albany, Troy, Rochester, Providence, St. Louis, Marshalltown, Iowa; Omaha, Hastings, Neb.; Madison, Montreal, Quebec, Toronto, Winnipeg, Calgary, and 300 other principal points throughout America.



KisselKar 60 "Six"



Standard G-E Automobile Motors, A size for every need

G-E Automobile Motors The Standard With Large Electric Truck Builders

Since the inception of the automobile industry, manufacturers of commercial vehicles have accepted General Electric Motors and Controllers as the standard. Statistics prove this statement, for during the present year 55% of the classified electric truck builders used G-E Motors and Controllers. This includes all the builders of large trucks. Including pleasure vehicles, 65% of all "electrics" made in this country are G-E equipped.

G-E automobile motors are especially designed, so that in starting, hill climbing or on heavy roads, the current required is maintained within the safe discharge rate of the battery,

Frame and one head of single piece cylindrical steel casting, original feature with General Electric Company. Note ball bearings.

—assuring wide radius of action on a single charge and long battery life.

G-E automobile motors are designed to allow the lowest possible weight consistent with mechanical strength—high efficiency at all loads, and minimum friction at bearings and commutator. The equipments embody the essential features which have made G-E motors pre-eminent in the solution of every haulage problem.

If contemplating the manufacture of electric vehicles, you may, without extra charge, receive the expert services of the General Electric Company's Engineers in the selection and application of your power equipment.

General Electric Company

Largest Electrical Manufacturer in the World

General Office: Schenectady, N.Y.

ADDRESS NEAREST OFFICE

Atlanta, Ga.	Cleveland, Ohio	Jacksonville, Fla.	Louisville, Ky.	Nashville, Tenn.	Salt Lake City, Utah
Baltimore, Md.	Columbus, Ohio	Joplin, Mo.	Madison, Wis.	New Haven, Conn.	San Francisco, Cal.
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Cincinnati, Ohio	Indianapolis, Ind.			Rochester, N. Y.	

For Texas, Oklahoma and Arizona business refer to Southwest General Electric Company (formerly Hobson Electric Co.), Dallas, El Paso, Houston and Oklahoma City. For Canadian business refer to Canadian General Electric Company, Lt'd, Toronto, Ont.

4537

National

"You don't have to raise the hood"

NATIONAL owners enjoy complete abandon of worry about mechanical parts of their cars. This confidence is found only in the perfected quality of *National* cars.

WE build *whole* cars—the name *National* guarantees them. Every *National* car is built as a *unit*—every mechanical part operates harmoniously to produce satisfactory *results*. You leave the responsibility for the *National's* mechanical construction to our years of experience—forget that there are gears and machinery operating beneath your soft cushions. You rest in comfort and give thought only to the ease and joy of motoring.

You can buy over telephone

NATIONAL owners buy performance and not specifications—they can buy their new *National's* over the telephone.

We sell our experience, ability, responsibilty and our guarantee—not a mere job of assembled wheels, axles, gears and parts. That's why you don't have to raise the hood to buy a *National*.

Lavish in comfort

BEAUTIFUL, economical efficient and lavish in comfort—this car is the climax of the *National's* success in car building since its pioneer beginning.

Brief Specifications—*National* Six

MOTOR—Six-cylinder, 3¾x5½ inch cast en bloc. Tire pump, integral part of motor. Clutch, self-contained aluminum cone. Starting and lighting, electric two unit system. Transmission, sliding gear selective type, three speeds forward, one reverse. Gauge 56 inches. Oiling, crank case constant level, force feed, with gear driven pump. Ignition, high tension, dual magneto with storage battery. Tires 36x4½. Firestone demountable rims. Air pressure gasoline feed, generated by small pump in crank case. Capacity, 23 gallons. Automatic carburetor. Two sets of brakes on 16-inch rear wheel drums. Bevel gear drive through straight line shaft with universal joints and torsion member. Full floating rear axle. Left side drive. Access all four wide doors. Single lever in center controls all speeds. Half elliptic springs, front, special National construction, rear.

EQUIPMENT—Top complete with side curtains and boot, ventilating rain vision windshield, extra Firestone rim, electric lighting and starting systems, 12-in. double bulb electric headlights, electric license tail light, Warner speedometer, electric horn, tools and jack.

National 40

THE *National* 40 is our staple car. Its years of marvelous success makes it stand out with silhouette distinctiveness against the background of all other cars. We believe this is the best all-round automobile ever made. We build on the series basis; every day begins a new year. We do not upset everything by rushing into yearly models with calendar seasons. We build on a constant system of improvements. The *National* is the accumulated product of years and not of a single season. This is the third year for this car, in all its essential features. This new series V-3 embodies all improvements. Five models, $2750 to $3400.

- SIX - $2375

Mail this Coupon

Gentlemen:—Without obligation on my part send me complete particulars of *National* cars.

Name .....

Address .....

National Motor Vehicle Co., Indianapolis, Ind.

Cadillac
Standard of the World

Cadillac again awarded the Dewar Trophy

Europe's highest Motor Tribunal pronounces 1914 Cadillac mechanical achievements to be the greatest of the year, demonstrating the advancement of the industry

In our first announcement of the 1914 Cadillac, and its two-speed direct drive axle, we said:—"The Cadillac is about to endow the motor car with A new element of efficiency, A new quality of luxury, A new source of economy."

After several thousand purchasers had received demonstrations of the truth of this prediction, we said in a later announcement:

"Motoring as you know it, and motoring as the owner of a 1914 Cadillac knows it, are two distinct and different things."

And we added, that the Cadillac owner was enjoying luxuries to which you must remain a stranger as long as you did not drive a Cadillac.

But we did not dream when we wrote the words, that so distinguished an endorsement as the second award of the Dewar Trophy was close at hand.

You will recall that the first award of the Dewar Trophy to the Cadillac pronounced it the most thoroughly standardized car in the world.

In the test, three Cadillac cars were entirely dismantled, all of the parts thoroughly mixed, and eighty-nine parts removed from the heap and substitute parts provided.

The three cars were then re-built into perfect running condition from the haphazard heap—wrenches and screw drivers being the only tools necessary.

Standardization was defined to mean in this test—as it always has meant—that every Cadillac part was exactly like every other part of its kind.

It did not mean nearly like it or almost like it, but absolutely like it, down to the one-thousandth part of an inch, where that degree of accuracy was essential.

In other words, that there was complete interchangeability, perfect alignment of parts and units, perfect harmony in their operating relations with each other, and a total absence of ill-fitting joints and bearings.

The Cadillac is the only car which has ever passed this tremendously significant test of what constitutes standardization; and the award to the Cadillac was the only one ever made upon such a test.

And that fact lends especial significance to this second award of the same trophy to the same car, but from a new angle of analysis.

It is one thing to feel sure that your manufacturing principles are sound and scientific.

It is another, and a more pleasant thing, to have that fact almost universally appreciated by your own countrymen.

But it is gratifying in the extreme to have the approval of your own nation reinforced by an international verdict.

You, as a Cadillac owner—present or prospective—can take just pride in this second award of the Dewar Trophy.

It is more than a Cadillac achievement—it is a tribute from high sources to American skill and to American engineering initiative.

THE DEWAR TROPHY

The Royal Automobile Club, which conducts the contests for the Dewar Trophy, is the most conservative tribunal of its type in the world.

The Dewar Trophy is the motor classic.

It is awarded for the most distinguished achievement of the year, demonstrating the advancement of the industry.

It takes into account manufacturing principles as well as performances.

Sir Thomas Dewar, when he instituted the Trophy, had it in mind to seek out, each year, the car of super-excellence.

So the awards are as disinterested, and as scientific, as the awards of the Nobel Prize in a totally different field of endeavor.

We may all of us feel justly reinforced, therefore, in our good opinion of this splendid American car, the Cadillac.

We may feel that its virtues have not been overstated.

We may all feel that these announcements have not overdrawn the advantages of the latest Cadillac development, the Cadillac two speed direct drive axle.

It was not merely the point-by-point performance of the car over give-and-take roads for a thousand miles.

It was not merely the certainty and the endurance of the electrical devices in self-cranking, lighting and ignition.

It was not merely the remarkable record of 17.17 miles per gallon of gasoline (notwithstanding repeated stops and starts in testing the electric cranking device.)

It was not alone the astonishing record of more than 1,000 miles per gallon of lubricating oil.

It was not only that the two-speed direct drive axle was a material factor in making possible these results; and that it gave to the word "luxury" a new meaning as applied to motoring.

It was not only the perfect record in the shifting of the rear axle gears from high to low and vice versa 520 times, by means of the electric shifting device.

No, the Dewar Trophy was awarded to the Cadillac for the second time—and the Cadillac is the only American car which has ever received it, and the only car in the world to which it has ever been awarded twice—because the Cadillac is the Cadillac, because it is what it is, and because it does what it does.

Because the Cadillac proved itself to be the car of all-around superexcellence as a complete entity.

Because it proved its dominant characteristics to be those which make most for all-around constancy and serviceability.

Because, as we have said, no other car rides or drives like the Cadillac.

Because, in fact, it is the Standard of the World.

CADILLAC MOTOR CAR CO., DETROIT, MICH.

When Writing to Advertisers, Please Mention Motor Age.

START YOUR CAR ON A WINTER DAY AS EASY AS THE SUMMER WAY

For Artificial or Natural Gas

Heat the Garage

Fill your tank with gasoline, let it spill if you want—there's no danger when you have a *Scientific Sa,ety Garage Heater* in your garage. Gasoline fumes cannot ignite or explode. The *only* recognized garage heater on the market. Insurance men and State Fire Marshals endorse it because it is absolutely safe. Built on the miner's lamp principle.

No. 700 Heater for garage 18x 20 feet. Price $25, freight prepaid.

Scientific Safety Garage Heater

(Built in three sizes according to heating radiation)

Thousands in use by auto owners all over the United States and Canada. It's just as easy to start your car in January as July when you own a *"Scientific."* Your garage is warm and dry—the mechanical parts of your car cannot rust—oil flows easily—the radiator cannot freeze or water jackets crack—the paint will not turn gray and check—adjustments and repairs on your car are made in perfect comfort—electric batteries take full charge—motor trucks become efficient—tires do not rot. These are a few of the features—*read the others.*

Cost of Operation

The Scientific Safety Garage Heater consumes either artificial or natural gas. It is beyond question the most economical heating device ever manufactured. Powerful, rapid and accurate, it heats the garage from zero to a high temperature in a short time.

People who have been in doubt as to its economy have put it to actual meter test and it has proved unquestionably every statement made.

Through a peculiar construction no heat is given off at the sides, thus permitting you to stand your car right next to it without blistering or scorching.

It is placed alongside the wall in what would otherwise be waste room.

Secure this Valuable Free Booklet Now!

Fill in the attached coupon at once and we will send you free of charge our valuable booklet, "Protecting Your Car in Winter," —a book which every motorist should have. Write to-day!

Simple to Install

The installation of the *Scientific Safety Garage Heater* is a very simple operation and can be done at slight expense by any local plumber or steam-fitter.

In connection with the heater we supply a hot water coil attachment, when desired, at a slight extra cost. This enables you to have hot water on hand at all times for washing the car without increasing the gas consumption one cent.

Only one match is required to operate the heater all winter long. Simply light it when cold weather begins and turn the pilot light up and down as you wish.

It is built of the finest acid proof materials, and is an ornament to any garage.

All heaters placed on 15 Days' Free Trial. Return at our expense if not satisfactory. We pay the freight.

The Scientific Heater Company

Dealers in All the Principal Cities. Some Good Territory Still Open.

1400 Power Avenue, Cleveland, Ohio

The cientific Heater Co., 1400 Power Avenue, Cleveland, Ohi

Send me your free booklet, "Protecting Your Car in Winter," and all other information regarding the Scientific Safety Garage Heater.

Approx. size of garage.....

Name .....

Address .....

SAFETY FIRST

Five Bars and a Cross Tie—the Safety First Symbol

Five thick, tough Goodrich rubber fingers—

They dig down through mud, slush and ooze; they clean and grip the road. They stop the skid before it starts. They give you lower-cost mileage because of the extra thickness of rubber at the point of contact.

Goodrich Safety Tread Tires

Best in the Long Run—Best in the Short Stop

Don't experiment. Don't take chances. Look for the five bars and the cross-tie when you choose a non-skid tire. Read the reduced prices below. Better still, tear out this price list and hand it to your dealer.

Don't pay more than the prices named here for the accepted *standard* non-skid tires:

Size	Smooth Tread Prices	Safety Tread Prices	Size	Smooth Tread Prices	Safety Tread Prices
30 x 3 - -	$11.70	$12.65	34 x 4½ - -	$33.00	$35.00
30 x 3½ - -	15.75	17.00	35 x 4½ - -	34.00	36.05
32 x 3½ - -	16.75	18.10	36 x 4½ - -	35.00	37.10
33 x 4 - -	23.55	25.25	37 x 5 - -	41.95	44.45
34 x 4 - -	24.35	26.05	38 x 5½ - -	54.00	57.30

Dealers almost everywhere have Goodrich Tires in stock or can get them for you from one of our branches or depots.

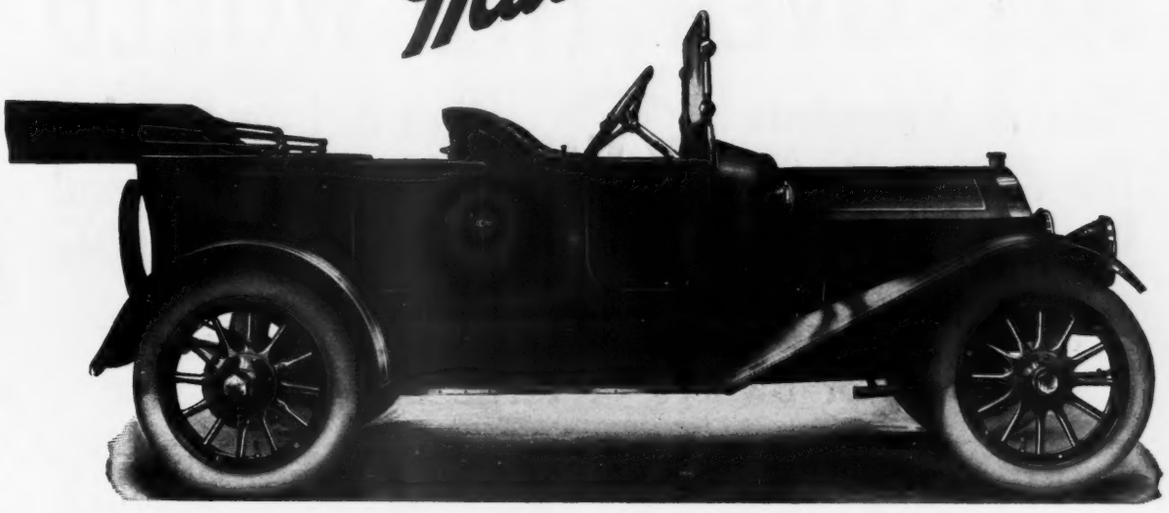
Factories: AKRON, OHIO

The B. F. Goodrich Company

Branches in All Principal Cities

There is nothing in Goodrich Advertising that isn't in Goodrich Goods

Marathon



AUTOMOBILE SHOW (New York City)

Because we were unable to secure exhibition space in the Grand Central Palace, we will hold an individual "Marathon Show" at

1770 Broadway at 57th Street

To miss the "Marathon" is to miss half the show if your visit is for information as to the best in the Automobile world.

Marathon $1095 Self-Seller

106 in. Wheel Base, 25 H. P. Completely Equipped Electric Lighted and Electric Started is the 1914 wonder of Automobile construction. It is but **one** of the "Marathon" family of six. All of equal interest to **seller** and **buyer.**

Some "Marathon" Territory is still open to Dealers who can give "Marathon" representation and "Marathon" service.

Write, wire or catch the first train for Indianapolis.

Herff-Brooks Corporation, Indianapolis

ALL OVER THE WORLD

Master Vibrators
Road Smoothers
Spark Coils

TRADE K-W MARK

High & Low Tension Magnetos & Head Lighting Outfits

are giving satisfactory service to thousands and thousands of owners of large and small cars

Every Third Ford

is equipped with a

TRADE K-W MARK **Master Vibrator**

because it gives
More Power—A Hotter Spark
A Smoother Running Engine
Easier Starting
One adjustment instead of four
Uses less gasoline
Cleaner Spark Plugs
Less Carbon Deposits

It takes place of four separate vibrators in your coil, giving you one fast vibrator and a powerful condenser, which insures absolute synchronism.

It costs but $15.00 and can be put on in half an hour; change in the car not necessary.

The K-W Master Vibrator is the Standard of Excellence all over the world.

Write for descriptive folder today.

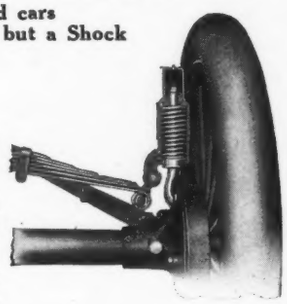
All Roads Seem Smooth

You drive with comfort and save your car and tires when you equip your car with

TRADE K-W MARK **Road Smoother**

"Just like riding on air"

Built especially for Ford cars
Not a Shock Absorber but a Shock Preventer
Easy to apply
Stops Vibration
Saves Tires



Price for Set of Four, $25.00.

The K-W Road Smoother is a combination of a spring hanger and a coil spring which acts in harmony with the regular spring hangers on a Ford Car. They take up the little jars that the larger springs cannot absorb.

They soon pay for themselves by effecting fuel and tire economies so the increased comfort costs nothing.

Write for full particulars and illustrated literature.

The TRADE K-W MARK **Electric Headlight Outfit**

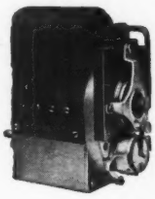
will bring your old or new car up to date. The complete outfit — Electric Generator, Head Lamps, Switch, Wire and Bulbs —only $40.00.

Write for complete information and descriptive folder. We also make the Ford Outfit for Fly Wheel Magneto, $15.00.

The TRADE K-W MARK **High Tension Magneto**

is the strongest magneto made, insuring absolute synchronism and requiring no coil timer or batteries.

Send description of your engine and ask for descriptive folders and price



We pay transportation anywhere on K-W Master Vibrator when cash accompanies order,

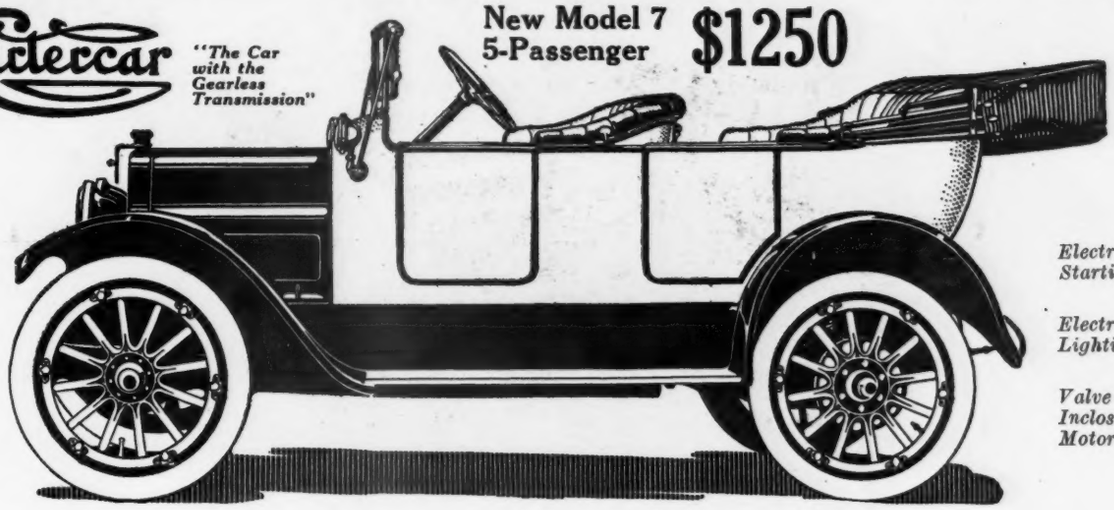
Give the Street Number → **2835 CHESTER AVE.**

THE TRADE K-W MARK IGNITION Co.
CLEVELAND, OHIO. U.S.A

and east of the Mississippi on other K-W products or to the Mississippi for points beyond.

Cartercar "The Car with the Gearless Transmission"

New Model 7
5-Passenger $1250



Electric Starting

Electric Lighting

Valve Inclosed Motor

The Cartercar Gearless Transmission—Twelfth Year of Success

For twelve years, or since the real beginning of the automobile business, we have been making Cartercars, the car with the gearless transmission. Far past the experimental stage, they are today a tremendous success, and their growing popularity shows the service that they give.

There are many reasons why the gearless transmission is the nearest perfect form of transmission on the market today. First, its simplicity. It has but two unit parts, a disk and a friction wheel. They roll together so smoothly that there is no jerk or jar in starting.

Second, its flexibility. It gives you any number of speeds instead of three or four, permits you to go from high directly into reverse without injury to the mechanism. The operation is merely moving a lever forward for greater speed and pulling the same lever back to reverse the car.

Third, its power. The tremendous leverage obtained enables you even to climb 50% grades, should you so desire. It also proves its worth on a steep hill, in a sandy road or on a crowded street, for it permits the car to roll along on any of the low speeds without racing the engine.

The roomy bodies, the long wheel base, the perfect upholstery, the superb finish, the big tires, the electric starting and lighting all controlled from the driver's seat, all these add touches that go to make the Cartercar the most satisfactory all round car on the market today.

It doesn't make any difference how many other makes of cars you have owned, or how exacting you are, or how hard you are on a car, if you purchase a New Model "7" Cartercar at $1250, you are sure to be more than pleased.

There Are Now Six Cartercar Models—Including Two New Ones—Will You Let Us Tell You About Them?

We are proud of our Cars and naturally we want to tell you about them. To begin with, we will tell you about the newest model.

Model "7" is produced in two designs, full five passenger, fully equipped, including electric lights and starter, demountable rims with one extra. Model "7" roadster is equipped the same, is on the same chassis, seats two people, has large space in rear for luggage, extra tires, etc. Each model "7" sells for $1250 and is one of the best values ever offered to the public. Ask to ride in a model "7."

Model 5-A, 5 passenger touring, 116 inch wheelbase, front seat, 40 inches wide, rear seat 50 inches, completely equipped, including electric starting and lighting. Price $1700.

Model 5-B, 2 passenger roadster, 116 inch wheelbase, seat 40 inches wide, completely equipped. Price $1700.

Model 5-C, 3 passenger Colonial Coupe, the ladies' favorite. Price $1900.

Model 5-D, 5 passenger Colonial Sedan, an ideal winter car, warm and luxurious, fully equipped. Price $2000.

A card will bring our New Catalogue

25 NEW DEALERS WANTED

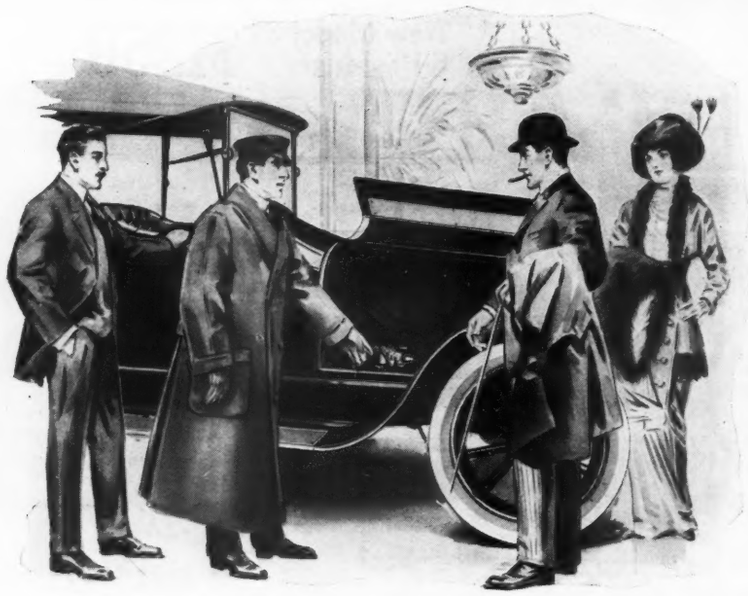
Our production has been so increased that we can take care of 25 aggressive new dealers. The best 25 writing us from unallotted territory will be given contracts for this splendid line.

Name..... Address.....

Cartercar Company

Pontiac, Michigan

Branches at: New York Chicago Detroit Kansas City Atlanta



"The Rayfield is the Point of Difference"

The presence or absence of the Rayfield Carburetor is sufficient reason for choosing or discarding a motor car.

That is, unless you care to go to the added expense of installing a Rayfield after you have bought your car.

A motor car may be a good car and still not have a Rayfield Carburetor; but it would be a *better* car if it did show the Rayfield.

A motor car may stand high in every other specification; but if it lacks a Rayfield Carburetor it is still lacking in quality.

RAYFIELD CARBURETORS

If you should choose a car that provides only a poor or ordinary carburetor, you can expect only poor or ordinary service in return.

For the carburetor is the point of difference between the "best" and the "not-so-good."

The Rayfield Carburetor is the final stamp of merit just as any less efficient carburetor is a confession of weakness.

And isn't this reasonable?

Supposing for instance that you see in an automobile the very latest developments in motors, the highest grade of clutch and transmission; the best self starter; and in fact every other specification that stands for motor car supremacy—

Supposing you lift the hood of such a car and note the absence of the Rayfield Carburetor, what are you to think?

You know, the same as thousands of others know, that the Rayfield is the one carburetor that has stood for all that is best in motor car practice.

What are you to think, then, when you notice the absence of the Rayfield on the car you thought was "best"?

There is only one answer. If motor car service is dependent upon perfect carburetion, and the car before you lacks the test-proven Rayfield, then, regardless of the quality it may show in other parts, you cannot expect to receive 100 per cent service.

And do you think it right for the manufacturer to handicap his car with a second rate foundation?

If the very basis of his motor car is skimped, how can he expect you to obtain the highest efficiency from it?

There is a lot to this carburetor business. It is no small task to lay the corner stone for the perfect running of your automobile.

But Rayfield experience is thorough; Rayfield improvements are well grounded; the Rayfield Carburetor embodies correctness of design and operation that is not duplicated.

For power, speed, economy, and efficiency the Rayfield Carburetor is a synonym.

As a basis upon which to build motor car service, it has no equal.

That's why the Rayfield is the point of difference.
The short step between the best and the "not-so-good"

Look for the Rayfield Service Station in your city.

FINDEISEN & KROPF MFG. COMPANY
2109 Rockwell Street, Chicago, Ill.
BRANCHES:—1140 Michigan Ave., Chicago; 1211 Woodward Ave., Detroit; 1902 Broadway, New York

If you are going to be at the Chicago Show make the Chicago branch of the Rayfield Company your headquarters and have your mail addressed care of us.

Firestone

NON-SKID TIRES

THE ALL-AROUND GOOD TIRES

THERE are twelve months in the Firestone year, and *every* one is a motoring month.

Watch the track of a Non-Skid Tire! See how the letters clutch deep, and make, in feathery snow or icy mud, a safe and certain path.

Winter and summer, bad roads and good, are alike to the powerful resilience of the Firestone Non-Skid Tread.

To the vise-like grip of the massive letters is added "life" in the rubber which "gives" over little obstacles and conquers big ones.

Now is the time to equip with Firestone Non-Skids. Once knowing their fuller service and true economy, they will be your all-the-year-round tires.

The Firestone Tire and Rubber Co., Akron, Ohio—All Large Cities

"America's Largest Exclusive Tire and Rim Makers"

Pneumatic Tires, Truck Tires, Pleasure Electric Tires, Carriage Tires, Fire Apparatus Tires, Rims, Tire Accessories, etc.

QUALITY · QUALITY · QUALITY · QUALITY · QUALITY · QUALITY

Now you must decide!

The tire selling field has undergone a great change in the past 12 months.

The car owner has become disgusted with tires that demanded constant replacements and adjustments.

More than ever he is looking for real quality, real service—*real mileage.*

For a time he was satisfied with tires made to "sell."

Now he is demanding the tires made to "use."

You must decide which tire you are going to sell

Will you cater to first-time sales with "popular-priced" tires—bearing yourself the expense and overhead selling cost of constantly "digging up" new customers, and losing old customers who are dissatisfied with cheaply made tires?

Or will you put your tire business on the right basis with tires made right—that deliver to the motorist the mileage he is entitled to—that always mean a satisfied user and a repeat sale that costs you nothing to make?

We have the quality kind of tire, and are looking for the right kind of dealer in a few selected territories.

If you are interested in ultimate profits as well as present sales—write or wire us at once.

THE REPUBLIC RUBBER CO.
YOUNGSTOWN, OHIO

Branches and Agencies in the Principal Cities

THE NEW REPUBLIC "WM" TREAD.

A New Tire for Small Car Owners

Here is the greatest small car, non-skid tire ever put on the market. The same quality of material and workmanship that go into Republic Staggard Treads, go into the "W M" Tire. It costs less than Republic Staggard Treads, but on Fords and cars of similar type, will give excellent mileage and service.

REPUBLIC MILEAGE

PLAIN AND STAGGARD TREAD

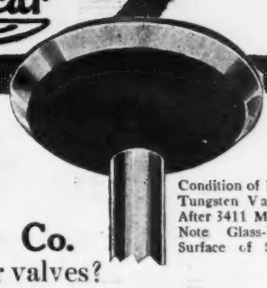
QUALITY · QUALITY · QUALITY · QUALITY · QUALITY · QUALITY

Why—

does the **Northway Motor & Mfg. Co.** **spend $150,000 more for Rich Tungsten Valves** than was formerly paid for ordinary valves?

Why does the **Mitchell-Lewis Motor Co.** **spend $50,000 more for Rich Tungsten Valves** than they spent for their former valves?

Why does the **Chalmers Motor Car Co. spend $80,000 more for Rich Tungsten Valves** than their former common valves cost them?



Condition of Rich Tungsten Valve After 3411 Miles. Note Glass-Like Surface of Seat.

Why will each of the leading motor car builders represented above spend **thousands of dollars more for Rich Tungsten Valves** for their 1914 models than the common valves cost them in the past?

There is a mighty good reason. It is told briefly, plainly and in a very interesting way in our free booklet — "Reasons for Rich Tungsten Valves." Send for a copy today. Learn about the valves that never pitt, warp, leak or need regrinding. Prices gladly quoted on any size and any quantity.

See Rich Tungsten Valves at the Shows

You will find us at the New York show in the Grand Central Palace on the fourth floor, space D-20-20A & 21. At the Chicago show we will be located in the Coliseum Annex, space 210-212. We will have a very complete exhibit of "the valves that never need regrinding," which will prove of intense interest to both the car owner and builder. Don't fail to look us up.

RICH TOOL COMPANY, 414 Railway Exchange Bldg., Chicago, Ill.

Greatest Automobile Test The World Has Ever Known

INDIVIDUAL owners have put their Winton Six cars to a test of strenuous service covering *more than three million miles.*

Figures compiled from the *sworn* statements of 286 owners appear on this page.

Ninety of these 286 cars established the *world's lowest* repair expense record of 25.1 cents per 1000 miles.

The performances of the remaining 196 cars are shown in the table.

And the grand totals for 286 cars show that in traveling 3,117,487.5 miles the whole repair expense averaged only $1.32 per 1000 miles—less than *one-seventh of one cent per mile.*

This was the most exhaustive automobile test the world has ever known.

The only kind of test that proves anything for individual buyers—the test of service in the use of the owner.

Look over these figures, and then send for a copy of our Repair Expense Book, which gives the records in detail.

This book is full of interest for every man who owns a car and pays repair bills.

Same Model—Seventh Year

We are the pioneer makers of sixes exclusively.

Our present model is the same car we have made for six years *without a single radical change.* Now in its seventh season.

Behind the Winton Six is a substantial company. Free from watered stock, from bonds, notes, and mortgages, from the burden of past extravagances; owning its plant scot free, taking cash discounts on all purchases, specializing on high-class work, employing expert and contented workmen, and pursuing policies that make for efficiency and permanence, the Winton Company stands behind the Winton Six with a guarantee that makes your purchase enduringly safe.

The Winton Six is a manufactured car, not an assembled car. Also it is the only car in the world whose repair cost is definitely known through the sworn statements of individual owners.

We shall be glad to send you our Repair Expense Book that gives the million-mile facts and figures in detail, together with our thoroughly descriptive catalog.

The Winton Motor Car Company

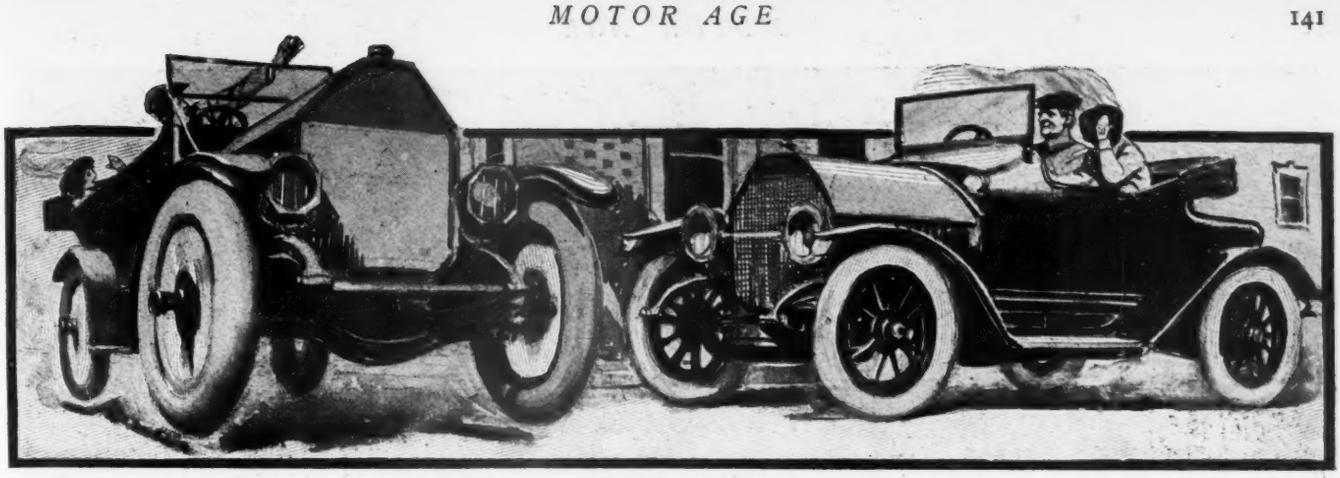
The World's First Maker of Sixes Exclusively

424 Berea Road, Cleveland, Ohio

Complete Record of Every Car Traveling 5000 Miles or More in the Six Annual Winton Six Repair Expense Tests of 1908, 1909, 1910, 1911, 1912, and 1913

CLASSIFICATION	Number of Cars	MILEAGE Total Miles	MILEAGE Average per Car	REPAIR EXPENSE Total	REPAIR EXPENSE Average per Car	REPAIR EXPENSE Average per 1000 miles
Cars making the world's lowest repair expense record	90	1,329,960	14,777.3	$ 333.71	$ 3.71	$0.251
Cars making the poorest records	53	552,098.3	10,416.9	3398.31	64.12	6.16
*Cars running without repair expense	72	601,604.2	8,355.6	.....	.....	.....
Cars not otherwise classified	71	633,825	8,927	380.47	5.36	.60
Totals for six years	286	3,117,487.5	10,900.3	$4112.49	$14.38	$1.32

*NOT INCLUDED IN ANY OTHER CLASSIFICATION.
Average repair expense for 286 cars, traveling 3,117,487.5 miles, is $1.32 per 1000 miles.



In a "Tight Corner"

All who drive automobiles must have dependable brake lining. That means it must be 100% *clear through.* That means Thermoid. Such facts we are telling car-owners in wide, national advertising. Wise dealers will take advantage of the *natural demand.*

Thermoid HYDRAULIC COMPRESSED Brake Lining—100%

These jobbers carry a complete stock

ALABAMA
Birmingham—Drennen Motor Car Co.

CALIFORNIA
Fresno—Chanslor & Lyons Co.
Los Angeles—Amer. Ever Ready Co.
Chanslor & Lyons Co.
E. A. Featherstone Co.
Weinstock-Nichols Co.
Oakland—Chanslor & Lyons Co.
Weinstock-Nichols Co.
Sacramento—Kimball-Upson Co.
San Francisco—Amer. Ever Ready Co.
Chanslor & Lyons Co.
Electric Appliance Co.
Mohrig Brothers
Weinstock-Nichols Co.

COLORADO
Denver—Auto Equipment Co.
Denver Auto Goods Co.
M. L. Foss
The Fry & McGill Motor Supply Co.
The George Hamburger Tool & Supply Co.
Shaffer Auto Supply Co.
Pueblo—Auto Equipment Co.

CONNECTICUT
Greenwich—Owners Tire & Supply Shop
Hartford—Chas. E. Miller
Meriden—Griswold, Richmond & Glock Co.

FLORIDA
Jacksonville—McGraw Bros. Co.
Tampa—American Supply Co.

GEORGIA
Atlanta—Chas. E. Miller
Elyea Austell Co.

ILLINOIS
Cairo—Cairo Motor Co.
Chicago—The Automobile Supply Co.
Chicago Rubber Co.
Cisler & Serson
Electric Appliance Company
Motor Car Supply Co.
Motor Supplies Co.
Danville—E. B. Collins Motor Co.
Freeport—Weiss & Co.
Quincy—Quincy Garage
Rock Island—Tri City Auto Supply Co.
Springfield—Springfield Auto Sales Co.
Streator—Williams Hardware Co.

INDIANA
Indianapolis—Gibson Automobile Co.
Ft. Wayne—Auto Supply Co.

IOWA
Clinton—Model Auto Co.
Davenport—Mason Carriage Co.
Des Moines—Des Moines Auto Sup. Co.
Dubuque—Dubuque Rubber & Belting Co.
Oskaloosa—Oskaloosa Auto Co.
Sioux City—Dymond-Simmons Hardware Co.
Schultz Auto Supply Co.
Waterloo—Repass Automobile Co.

KANSAS
Wichita—C. A. Hagberg Rubber Co.
Morton-Simmons Hardware Co.

KENTUCKY
Louisville—Andrew Cowan & Co.

LOUISIANA
New Orleans—Electric Appliance Co.
Interstate Electric Co.
Chas. E. Miller

MARYLAND
Baltimore—City Auto Supply House
Coggin & Owens
R. M. Stein Co.

MASSACHUSETTS
Boston—Boston Tire & Rubber Co.
Chas. E. Miller
Motor Accessories Co.
Puritan Motor Supply Co.
New Bedford—Auto Selling & Supply Co.
Springfield—Chas. E. Miller

MICHIGAN
Coldwater—Coldwater Garage Co.
Detroit—Automobile Equipment Co.
Automobile Supply Co.
Chas. E. Miller
Flint—Cumings Bros.
Grand Rapids—Michigan Tire Co.

MINNESOTA
Duluth—Kelley-How-Thomson Co.
Kelley Hardware Co.
Minneapolis—Pence Auto Co.
Simmons Hardware Co.
St. Paul—Nichols, Dean & Gregg
Reed Motor Supply Co.

MISSISSIPPI
Vicksburg—Lee Richardson & Co.

MISSOURI
Cape Girardeau—Cotner Auto Sup. Co.
Kansas City—Faeth Iron Co.
Motor & Machinists Supply Co.
St. Joseph—Wyeth Hdw. & Mfg. Co.
St. Louis—Koochook Rubber Co.
Neustadt Automobile & Supply Co.
Simmons Hardware Co.
United Electric & Supply Co.

NEBRASKA
Omaha—Omaha Rubber Co.
Western Auto Supply Co.

NEW JERSEY
Atlantic City—Cuskaden Auto Sup. Co.
States Garage
Newark—Chas. E. Miller
Newton-Humphreville Co.
W. S. Sheppard
Paterson—H. Lund Smith

NEW YORK CITY
The Auto Supply Co., 1789 Broadway
Crane & Stendicke, 1912 Broadway
DeVere & Strang, 84-86 Chambers St.
General Automobile Supply Co., 1671 Broadway
Frank P. Hayes Co., 116 Duane St.
Lowe Motor Supplies Co., 1727 Broadway
Chas. E. Miller, 924 8th Ave. & 2782 Broadway
Mutual Auto Accessories Co., 58-60 W. 65th St.
New York & Brooklyn Auto Supply Co., 1717 Broadway
New York Sporting Goods Co., 17 Warren St.
Simmons Hardware Co., 100 Lafayette St.
W. A. Shanahan Co., 138 W. 68th St.
Smith-Haines Co., 1761 Broadway
Weaver Ebling Automobile Co., 2230 Broadway
Westchester Accessories Co., 1777 Broadway
Whittemore-Sim Co., Inc., 1976 Broadway
Yorkville Auto Supply Co., 1235 Lexington Ave.

NEW YORK
Albany—Chas. E. Miller
Brooklyn—Henry Acker
Bedford Auto Supply
Chas. E. Miller
Buffalo—Cycle & Auto Supply Co.
Iroquois Rubber Co.
Chas. E. Miller
Huntington—Sammis & Downer
Rochester—Rochester Rubber Co.
Schenectady—Jay A. Rickard Co.
White & Stevens
Syracuse—H. R. Olmsted & Son
Syracuse Rubber Co.
Utica—Utica Cycle Company
Yonkers—R. B. Hibbard, Inc.

NORTH CAROLINA
Asheville—Dixie Motor Co.

NORTH DAKOTA
Fargo—Northwestern Auto Supply Co.

OHIO
Cincinnati—The I. J. Cooper Rubber Co.
Cleveland—The Collistern & Sayle Co.
Chas. E. Miller
The M. & M. Co.
Columbus—The I. J. Cooper Rubber Co.
Dayton—G. W. Shroyer & Co.
The I. J. Cooper Rubber Co.
Newark—Ball-Fintze Co.
Toledo—Standard-Simmons Hdw. Co.

OREGON
Portland—American Ever Ready Co.
Archer & Wiggins
Ballou & Wright
Chanslor & Lyons Co.

PENNSYLVANIA
Erie—Jacob Roth
Johnstown—The Johnstown Automobile Co.
Oil City—Riesenman Supply Co.
Philadelphia—Gibney Motor Sup. Co.
Grims Auto Supply Store
Chas. E. Miller
Geo. W. Nock Co.
Simmons Hardware Co.
Supplee Hardware Co.
Pittsburgh—Auto Accessories Co.
Dyke Motor Supply Co.
Jackson Motor Supply Co.
J. & M. Auto Supply Co.
Pittsburgh Rubber Co.
Joseph Woodwell Co.
Reading—Keyser Fry
Wilkes-Barre—H. P. Kinsella

RHODE ISLAND
Providence—Belcher & Loomis Hdw. Co.
J. C. Brown Co.
Waite Auto Supply Co.

SOUTH CAROLINA
Florence—D. W. Alderman, Jr.

SOUTH DAKOTA
Sioux Falls—H. F. Brownell Co.

TENNESSEE
Chattanooga—Wallace Buggy Co.
Memphis—Auto Supply Co.

TEXAS
Dallas—Electric Appliance Company
The Fisk Company of Texas
Houston—The Fisk Company of Texas
San Antonio—The Fisk Company of Texas

VERMONT
White River Junction—Miller Auto Co.

VIRGINIA
Norfolk—J. M. Hubbard & Co., Inc.
Richmond—Standard Auto Equipment Co.

WASHINGTON
Seattle—American Ever Ready Co.
Ballou & Wright
Chanslor & Lyons Co.
Spokane—Chanslor & Lyons Co.
Child, Day & Churchill.

WISCONSIN
Green Bay—Morley-Murphy Hdw. Co.
Madison—L. F. Schoelkopf
Milwaukee—Julius Andrae Sons Co.
Philip Gross Hardware Co.

CANADA
ALBERTA
Calgary—The Canadian Fairbanks Morse Co., Limited
Motor Car Supply Co., Limited

BRITISH COLUMBIA
Vancouver—The Canadian Fairbanks Morse Co., Limited

MANITOBA
Winnipeg—The Canadian Fairbanks Morse Co., Limited
J. H. M. Kennedy & Co.

NEW BRUNSWICK
St. John—The Canadian Fairbanks Morse Co., Limited

ONTARIO
Fort William—The Canadian Fairbanks Morse Co., Limited
Ottawa—The Canadian Fairbanks Morse Co., Limited
Toronto—The Canadian Fairbanks Morse Co., Limited

QUEBEC
Montreal—The Canadian Fairbanks Morse Co., Limited
Quebec—The Canadian Fairbanks Morse Co., Limited

SASKATCHEWAN
Saskatoon—The Canadian Fairbanks Morse Co., Limited

GENERAL AGENT FOR EUROPE
S. Obermer, Paris, France

SOLE SELLING AGENTS
Great Britain—Ed. J. Hardy & Co., Ltd., Coventry, England
France—Mestre & Blatge, Paris
Germany—Rudge Rad, g. m. b. H., Berlin
Belgium—Mestre & Blatge, Bruxelles

BRANCHES
250 W. 54th St., New York City
2009 S. Michigan Ave., Chicago, Ill.
Bulletin Building, Philadelphia, Pa.
Hartje Building, Pittsburgh, Pa.
1120 Pine St., St. Louis, Mo.
Majestic Building, Detroit, Mich.

Our Guarantee: Thermoid will make good—or WE will.

Not affected by heat, oil, water, gasoline or dirt

THERMOID RUBBER COMPANY, Trenton, New Jersey

Talk with the man who rides on TIMKENS

YOU can't know too much about the motor-car—the one you own or the one you expect to buy. Timken advertisements have told you about the foundations of the car—the axles and bearings. They have told you how two great Timken organizations are devoting themselves solely to the tasks and ideals of building the axles and bearings that will give the best possible service in motor-cars, pleasure and commercial.

And you know that it is not what the *maker* says about his products but what *users* say about the *performance* of those products that makes or breaks their reputation.

Sincere advertising pays. We believe in it and in the big definite objects of Timken advertising. Have you wondered what those objects are?

Timken Axles and Bearings are not in any sense "accessories." They are important *integral parts* of the car and can be sold only to car manufacturers. There exist in the United States not more than 150 car makers who can be possible Timken customers.

ONE great object of Timken advertising is to emphasize the obvious fact that cars which are to give lasting satisfactory service *must be built of the right parts*. Right foundations—axles and bearings; right motor, steering mechanism, springs—right every part.

And these right parts must be rightly "engineered" into the car by the combined efforts of the engineers who design the car and the engineers who design the integral parts.

Emphasizing these facts helps the whole motor-car industry.

We believe the public will reward all of us makers of axles, of bearings, of other parts and of complete cars who are sincerely striving to put the utmost use-service-value into our products.

ANOTHER object is to so *widen* the existing good reputation of Timken Axles and Bearings that they will have, in addition to their service value to the car owner, a distinct selling value to the car manufacturer. Knowing, as you and we do, that a *lasting* selling value can exist only where the truth is told and can be proved.

Widening the good reputation of Timken Bearings and Axles will, we believe, render a real service to car buyers—because Timken Axles and Bearings are standing up to the test of every-day use; a real service to dealers and manufacturers—because selling *real* values is their problem; and a real service to ourselves—because our future business success depends on the success of users, dealers and makers of Timken-equipped motor-cars.

THUS you have the main objects beneath all Timken advertising. And to accomplish those underlying objects each individual advertisement aims to induce you to talk with the man—there are thousands of him, everywhere—the man who rides on Timkens.

Those of you who ride on Timken Bearings and Axles know what service they render. Tell it, we urge you, tell it to others—for their benefit.

And you who are going to buy cars, ask about the day-after-day and year-after-year service Timken Axles and Bearings are giving. Ask, for your own benefit.

WHILE earnestly trying to build the axles and the bearings that will give the best account of themselves in use we recognize you, the car owners, as the court of final appeal. Our whole future success depends upon your verdict. If now or in the future you find that other axles or other bearings are giving better service than Timkens we not only expect, but advise, you to give them your support.

It is only because of our supreme faith in our ideals and our products, axles and bearings, that we dare ask you—for your own information and benefit, to talk with the man who rides on Timkens.

The reasons back of our confidence in your verdict are given in the Timken Primers, T-1 "On the Care and Character of Bearings" and T-2 "On the Anatomy of Automobile Axles." Sent free, postpaid, on request to either company.

THE TIMKEN ROLLER BEARING COMPANY
Canton, Ohio
THE TIMKEN-DETROIT AXLE COMPANY
Detroit, Michigan

TIMKEN
BEARINGS & AXLES

When Writing to Advertisers, Please Mention Motor Age.

THE SPLITDORF ELECTRICAL COMPANY faces the ignition problems of the future with the confidence of a rejuvenated giant girded to accomplish the most herculean tasks—

with stronger frame as represented by vastly improved manufacturing methods and greatly augmented manufacturing facilities—

with a keener head and riper knowledge—thanks to accumulating years of hard practical experience—

with sinews and muscles of greater suppleness and strength owing to the enjoyment of unlimited financial resources—

with more far-reaching arms as indicated by the ever-increasing number of branch houses and distributing centers—

with a heart more insistent than ever to render real service to the consumer at thoroughly equipped service stations—

with a mind bent upon supplying ignition units of magnetos, plugs, transformers, coils, lighting and starting outfits, etc., better in design, in material, in manufacture and in every day usage than the best—

and with a perfectly healthy system that is the real foundation of the success of SPLITDORF controlling interests — an organization drilled and trained and geared like a wonderful piece of machinery — a vital, breathing, insistent force, irresistible in its confidence, strength, intensity and loyalty.

A full line of SPLITDORF up-to-the-minute magnetos, transformers, plugs, electric lighting and starting outfits, etc., on exhibition at
New York Show, *Grand Central Palace. Spaces 60 and 73*
Chicago Show, *Coliseum and Armory. Spaces 56 and 73*

SPLITDORF ELECTRICAL COMPANY
Factory: NEWARK, NEW JERSEY

NORTHWAY'S MOTOR CAR

OHIO ON THE MAP

STANDARD OF THE WORLD

The Wise Ones Choose The Crescent

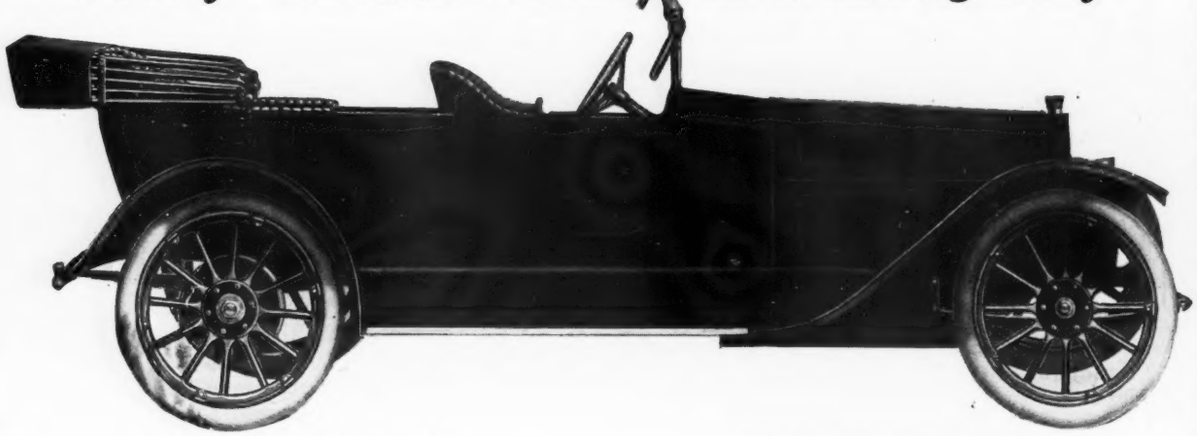
(Motor Co.'s)

Royal Ohio Models

The Crescent joins together Northway's manufacturing plant with Paxson's selling organization. Time's noblest offspring is the latest. This is Northway's latest.

After years of experience, exhaustive tests and expensive experiments, the greatest of all designers and inventors, Mr. R. E. Northway, the founder of the Northway Motor Co. and original designer of that now famous motor, which is acknowledged by the best engineers and experts to be the greatest motor in the world, now brings out his latest and greatest of all motors, to be used exclusively by the Crescent Motor Co. of Cincinnati, O.

Northway's Latest and Greatest Crowning Glory



ROYAL MODEL, $1,985

MOTOR—Six-cylinder, 4 x 6.
AXLE—Full floating on annular bearings.
TRANSMISSION—Four speeds ahead and one reverse.
CLUTCH—Multiple disc.
CONTROL—Center and left hand drive.
SPEEDOMETER—Warner, flush.
TIRES—35 x 4½ and 36 x 4.
WHEEL BASE—132 inches.
ELECTRIC STARTER, LIGHTS and HORN.
RIMS—Demountable.

OHIO MODEL, $1,275

MOTOR—Four-cylinder, 4¼ x 4¾.
AXLE—Floating on Roller Bearings.
TRANSMISSION—Three speeds ahead and reverse.
CLUTCH—Multiple disc.
CONTROL—Center.
SPEEDOMETER—Stewart.
TIRES—34x4.
WHEEL BASE—116 inches.
ELECTRIC STARTER, LIGHTS and HORN.
RIMS—Demountable.

We are now ready to contract with good, reliable, live, wide-awake dealers and distributors on this greatest of all lines

THE CRESCENT MOTOR COMPANY

C. D. PAXSON, Gen. Sales Mgr.
1900 Euclid Ave., Cleveland O.

W. T. HUNTER, Pres., Cincinnati, Ohio
BELLAMORE & TOOMEY, Export, 10 Bridge St., New York City

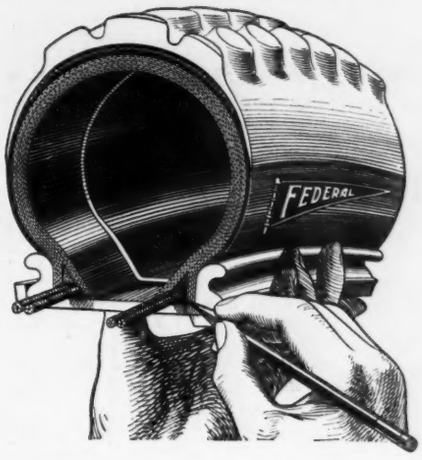
A Great New Principle of Tire Construction

—that supplies firm anchorage to rim

—that prevents tire blow-offs

—that precludes side wall breaks

—that stops tube-pinching



FEDERAL Double-Cable-Base TIRES

Trade Mark Trade Mark

The Double-Cable-Base construction is a new and original principle of tire construction used exclusively in Federal Tires—it consists of two endless, unstretchable cables fitted carefully and accurately into the base of tire bead. These strong cables withstand the severest strain and provide a "heel and toe" anchorage, the strength and firmness of which has heretofore never been known in tire building. This new construction positively puts an end to tires blowing from the rim, and renders tube pinching impossible.

The Double-Cable-Base construction conquers one of the most serious and damaging factors known to tire users—*Side Wall Breaks and Rim Cutting.* The side walls of Federal Double-Cable-Base Tires cannot break, because a strong but pliable filler with elastic point is substituted for the commonly used hard, sharp, unyielding bead-filler. The unyielding bead-filler in other tires impedes and prevents full and easy flexing at the point of contact of tire and side rings. Flexibility at the *vital point* is provided by this new construction in Federal Tires, which furnishes absolute immunity from the evil of side wall breaks and rim cutting.

The Double-Cable-Base construction is embodied in both the Federal Straight-Wall and Quick-Detachable Clincher types.

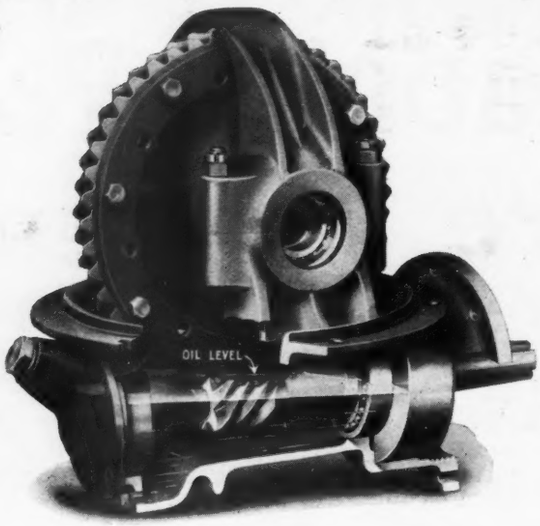
Federal Double-Cable-Base Tires have already established a marvelous record for efficiency—50,000 tires have stood the test of eight months' hard service without a single complaint of Side Wall Breaks—Rim Cutting—Tube Pinching—Tire Blow-offs.

Look up a Federal Dealer and have him explain this wonderful improved tire construction to you.

Dealers—Write at once for literature containing some very strong reasons why you should handle Federal Double-Cable-Base Tires.

Federal Rubber Mfg. Co., Milwaukee

Branches, Service Stations and Distributors Everywhere



How Quality Is Built Into Detroit Electric Worm Gears

For the dealers who prefer to sell—and the customers who prefer to buy—a worm-driven electric, we offer in our 1914 cars a worm gear axle of surprising quality.

This axle is distinctly a Detroit Electric axle.

It is built in our own shops—the worm gears being specially imported.

In this axle the worm (as shown in the cut) is placed **below** the ring gear in a bath of oil—the only correct position to insure adequate and constant lubrication. This is the practice adopted by the best manufacturers abroad. It is an assurance of long life to the gear mechanism.

Extra large bearings are used in the Detroit Electric axle. Thus we insure our dealers and our customers against bearing trouble.

Into the axles go only the highest quality steels, heat-treated to increase their strength and wearing qualities. Drive shafts, live axles, gears, worms, bearings, housings—all are required to measure up to the high standards which make the Detroit Electric the most accurately built of all electric cars.

THE Detroit ELECTRIC

Three models are offered on the Detroit Electric worm gear chassis—the five-passenger Duplex Drive brougham at $3,000; the four-passenger brougham (rear seat drive) at $2850; the roadster at $2500.

We also build our cars with bevel gear axles, offering three models on this chassis—the five-passenger brougham (front seat drive), $2800; the four-passenger brougham (rear seat drive), $2850; the Victoria, $2300.

We will be glad to send, upon request, our new illustrated Detroit Electric catalog, and information about the opportunity for dealers. Write for it.

Anderson Electric Car Co., Detroit, Mich.

BUILDERS OF "THE DETROIT ELECTRIC"

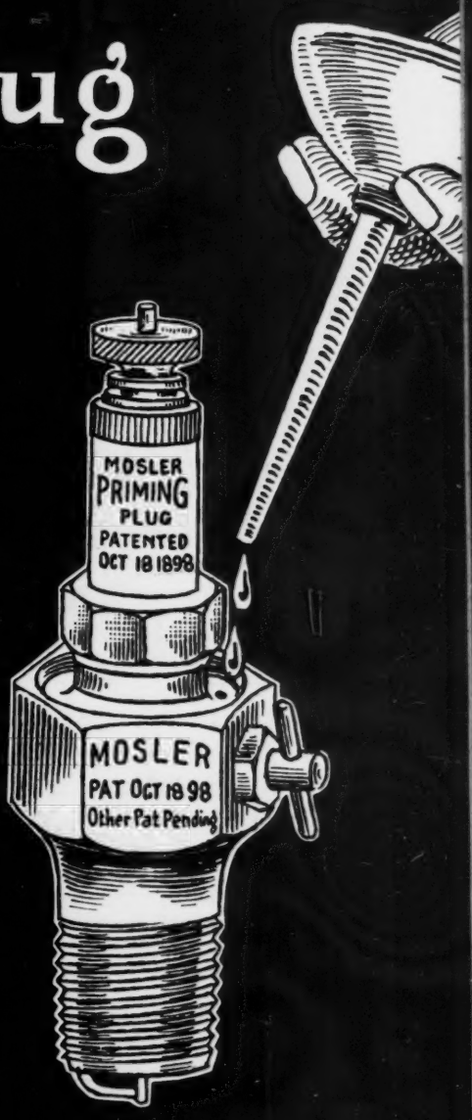
Largest manufacturers of electric pleasure vehicles in the world

Mosler Spit Fire PRIMING Plug

Ford

AND ALL OWNERS
READ THIS

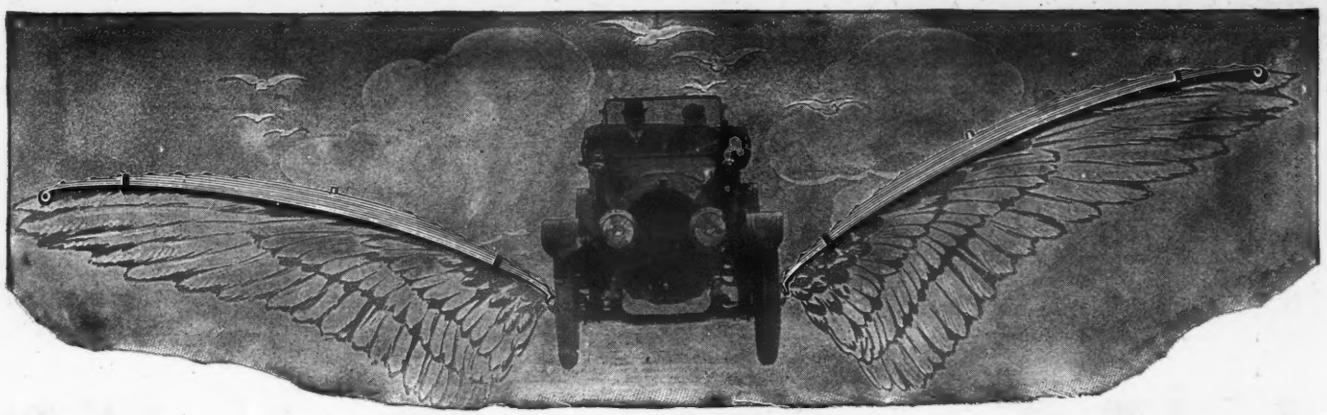
Not a copy.
Original in design.
Not a makeshift.
Made an integral part of the plug
No valves to leak.
No soldered extension.
The groove in the plug is the receptacle for the gasoline.
The body of the shell carries a needle-valve which seats itself, making an absolutely hermetically sealed joint.



021

A.R.MOSLER & CO. MT.VERNON,N.Y.

NATIONAL AUTO SHOWS
NEW YORK, JAN. 3-10
CHICAGO, JAN. 24-31



Ride on These Wings of Steel

Flexibility, Security, Durability—all these essential qualities are forged into Detroit Springs. Their "give and take," backed up by a sturdiness unequalled, enables your car to skim the roughest road with comfort and safety to you. They afford, as well, a constant protection to your car's mechanism.

There is only one true test of spring worth—the test of time. One ride—even one *year* will *not* tell the lasting story. That is why Detroit Springs can carry a *two year guarantee*—they have the *quality* that *holds*. For your own satisfaction and safety, you should *demand that your next car be equipped* with

Demand the Springs Which Are Self-Lubricating

RESILIENT **Detroit Springs**

SILENT TRADE MARK =SELF-LUBRICATING

The Springs Bearing this Trade-Mark

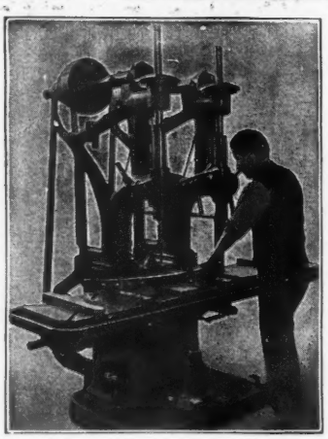
The result for you will be springs that will not squeak, rattle, settle or break. Comfort in riding such as you have never thought possible.

And these accomplishments for you are not something Detroit Springs just *happen* to provide. Years of research and experiment, tests beyond number by top-notch spring engineers—have combined to make quality of material, workmanship and results, an unchangeable habit at the Detroit Steel Products factory.

Triple Heat Treatment, for example, is taken as a matter of course. Single or double heat treatment, even, only too often satisfy the manufacturer whose product is hurriedly made to sell at a price.

But nothing short of the Detroit Steel Products triple and exact heat treatment and oil quenching will insure against sagging, weakening and breakage. Therefore nothing less than this standard has a minute's consideration in Detroit Spring manufacture.

Everywhere from ore to finished product our demand of D. S. P. engineers is *Quality without sacrifice*.



An indication of Detroit Spring minute exactness is found in the "eye" which is reamed out by machine here shown, to one one-thousandth part of an inch.

Detroit Springs for each individual make of car are planned, forged, treated, fitted and tested for that car and no other. Your emergencies as well as your every day road experiences, are multiplied, and form the uncompromising standard by which the springs for your car are tested.

The "Initial Test," the "Hardness Test," the "Capacity Test"—one proves the permanence of the resiliency, one determines whether the texture strength is up to standard, one tests complete spring repeatedly.

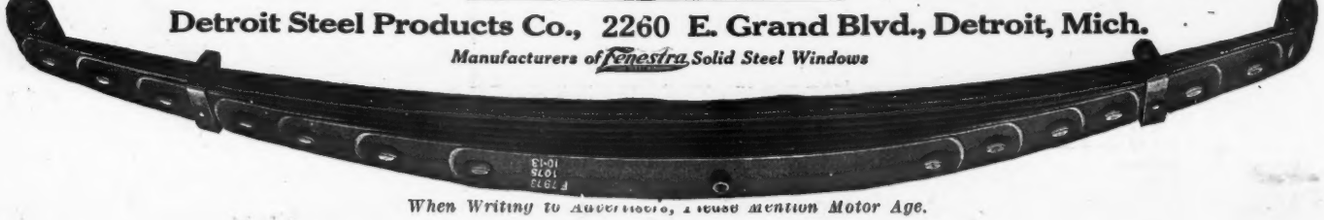
Combined, these tests try the spring as no road ordeal could. And the spring must come through unscathed or it is rejected.

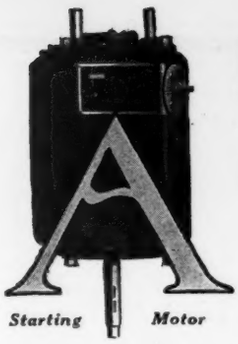
Write for the booklet that explains these tests in detail and demonstrates your need of Detroit Springs. It explains how Detroit Springs insure you safety and lengthen the life of your car and tires.

Study the newly invented self-lubricating feature, which removes the possibility of spring squeak. Learn of the two-year guarantee which puts full responsibility for your riding comfort and spring safety up to us.

Detroit Steel Products Co., 2260 E. Grand Blvd., Detroit, Mich.

Manufacturers of Fenestra Solid Steel Windows



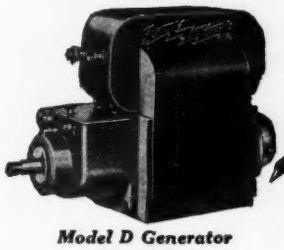


T THE SHOWS

you will have an excellent opportunity to examine and test the relative capabilities of the various electric lighting and starting systems.

Complete working models of all types of Auto-Lite instruments will be on exhibition in our booth at each show.

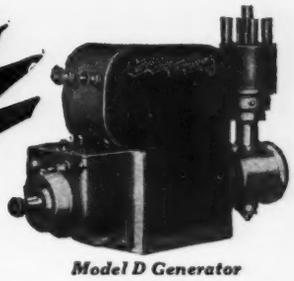
You will find much of importance and interest in our display, and in the technical handbooks which we have just issued for the new year.



Model D Generator
Type S.R. 4

AUTO-LITE ELECTRIC STARTING and LIGHTING SYSTEM

"As Sure as the Whirl of the World"



Model D Generator
Type V.R. 4

THE AUTO-LITE STARTING MOTOR

8 inches in length, 5½ inches in width, will crank the largest six cylinder engines at a speed of over 100 revolutions per minute on less than 100 amperes of current.

Can be attached to any automobile engine in either a horizontal or vertical position.

Compactly enclosed in cast iron case, dust and water proof.

THE AUTO-LITE LIGHTING GENERATOR

Made in two types—S.R. 4 and V.R. 4—as shown. Runs at engine speed, directly connected to pump or magneto shafts, no chains, sprockets or gears required. Reaches its maximum output of about twelve amperes at car speed of about eighteen miles per hour.

Begins to produce current at six miles per hour.

Operates at 6 volts—weighs 37½ lbs.

V.R. 4 is fitted with standard distributor and timer, and by its use the magneto is discarded and generator placed on its bracket.

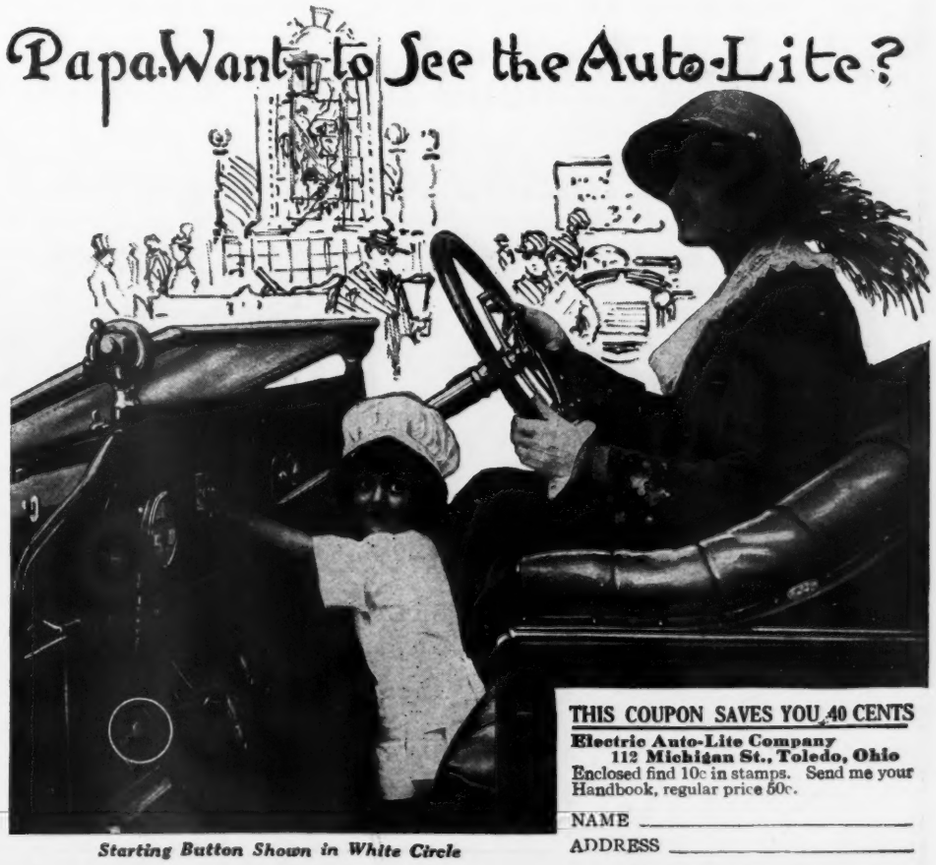
This generator produces sufficient current to keep a 120-ampere hour battery always charged for starting, lighting and ignition.

The Electric Auto-Lite Company

"The Pioneer Makers of the 6-volt electric system."

TOLEDO - OHIO

New York Detroit Kansas City San Francisco



Starting Button Shown in White Circle

THIS COUPON SAVES YOU 40 CENTS

Electric Auto-Lite Company
112 Michigan St., Toledo, Ohio

Enclosed find 10c in stamps. Send me your Handbook, regular price 50c.

NAME _____

ADDRESS _____

The Apple Electric Company

Cable Address "Apple" **Dayton, Ohio**

America's Leading Manufacturer of

Electrical Equipment for Motor Cars and Motor Boats

Electric Engine Starters
Electric Lighting Equipments for Motor Cars

Electric Engine Starters
Electric Lighting Outfits for Motor Boats

The Famous Apelco Storage Batteries

Electric House Lighting Plants

WRITE FOR BULLETINS

The Apple Electric Company

Cable Address "Apple" **Dayton, Ohio**

THE APPLE ELECTRIC CO. WILL EXHIBIT AT THE NEW YORK SHOW AT SPACE C-94 AND 95, GRAND CENTRAL PALACE. ALSO AT THE CHICAGO SHOW. DEMONSTRATING APPARATUS AND EXPERTS AT EACH SHOW.

Apelco Service Stations

Newark, N. J.	290 Halsey St.
New York City	18-20 W. 63rd St.
Philadelphia	210-212 N. 13th St.
Boston, Mass	180 Massachusetts Ave.
Atlanta, Ga	10-12 E. Harris St.
Chicago, Ill	64-72 E. 14th St.
Kansas City, Mo	1823 Grand Ave.
Los Angeles, Cal	1228 So. Olive St.
Seattle, Wash	1628 Broadway
San Francisco, Cal	1028 Geary St.
London, England	6 City Road
Buenos Aires	964 Calle Belgrano
Detroit, Mich	972 Woodward Ave.

FIG. 1 shows the Lewkowicz Convertible Body mounted on a Ford car, showing the body when used as an entirely enclosed inside drive.

A REAL CONVERTIBLE AUTOMOBILE BODY

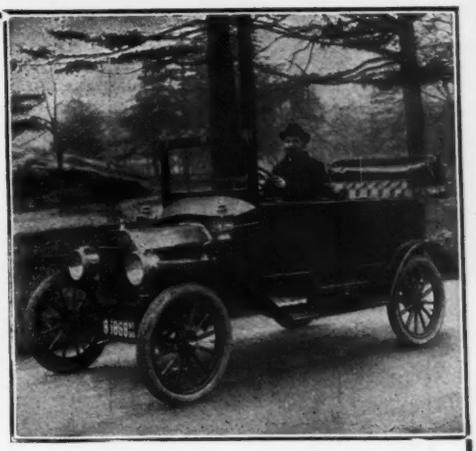


FIG. 2 shows the Lewkowicz Convertible Body when used as a touring car.

Combining the pleasures of an open touring car with the comfort and protection of an inside drive car for every day in the year, is the LEWKOWICZ CONVERTIBLE AUTOMOBILE BODY.

Mr. Ladis Lewkowicz, the well-known aviator, has invented and designed a convertible automobile body which can be used as well on the cheapest as on the most expensive automobile. The model shown here, mounted on a Ford car, is specially designed to meet the requirements of medium-priced cars. The main features of this convertible automobile body are:—

1. **Simplicity of mechanical devices.**
2. **Quickness in converting a touring car into an inside drive in less than one minute's time. LADIES CAN DO IT.**
3. **No tools necessary.**
4. **Not a screw, not a bolt, not a pin, used in converting the touring car into an inside drive.**
5. **No necessity of unscrewing windows from their position and placing them in special cases in the back of the seats, the windows dropping in their casing on the side of the car like in the most expensive limousine.**
6. **Air and water proof.**
7. **Solid and staunch as a limousine.**

MANUFACTURERS OF CARS—do you want to please your customers and get some of your competitors' customers? Get our convertible body as part of your standard equipment, *built by yourself.*

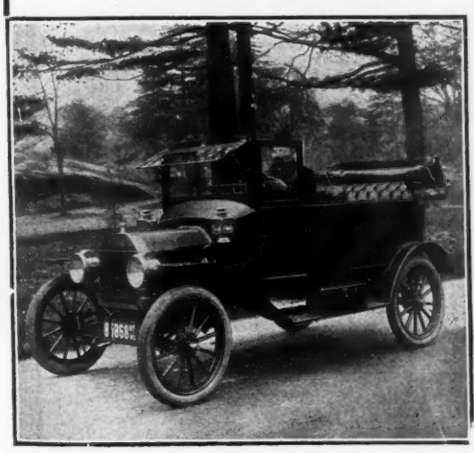
MANUFACTURERS OF BODIES—do you want more business? Anticipate competition, by being the first one in your line to be licensed by us and get a ground floor proposition.

REMEMBER THE ACTUAL COST OF CONSTRUCTING THE LEWKOWICZ CONVERTIBLE BODY AMOUNTS NOT OVER 10 PER CENT. MORE THAN THE ACTUAL COST OF A TOURING BODY, TOP AND WINDSHIELD.

PRIVATE OWNERS of every make of car, from a Ford to the most expensively built car—we will be ready shortly to make delivery directly to you or to your dealer in your own town.

Write immediately and make an appointment for a demonstration during the Show Week in New York. We will meet you with our car at your hotel, at the show or when and where you may elect. This demonstration will prove that our claims are based below actual worth.

FIG. 3 shows the same body with the first windows on each side of the car mounted and used as side windshield for protection against dust.



Convertible Automobile Body Corporation

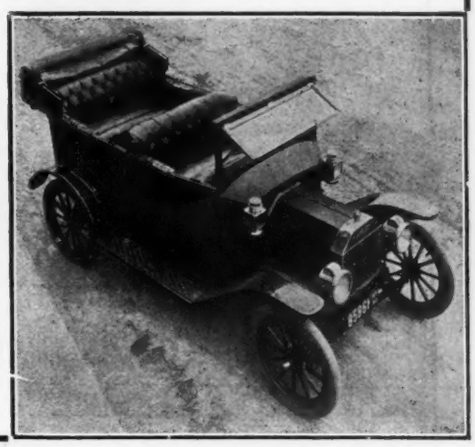
LONGACRE BUILDING

Broadway and 42nd Street

Phone 7835 Bryant

NEW YORK CITY

FIG. 4 shows a top view of the Lewkowicz Convertible Body showing all windows in their position when in their casings.



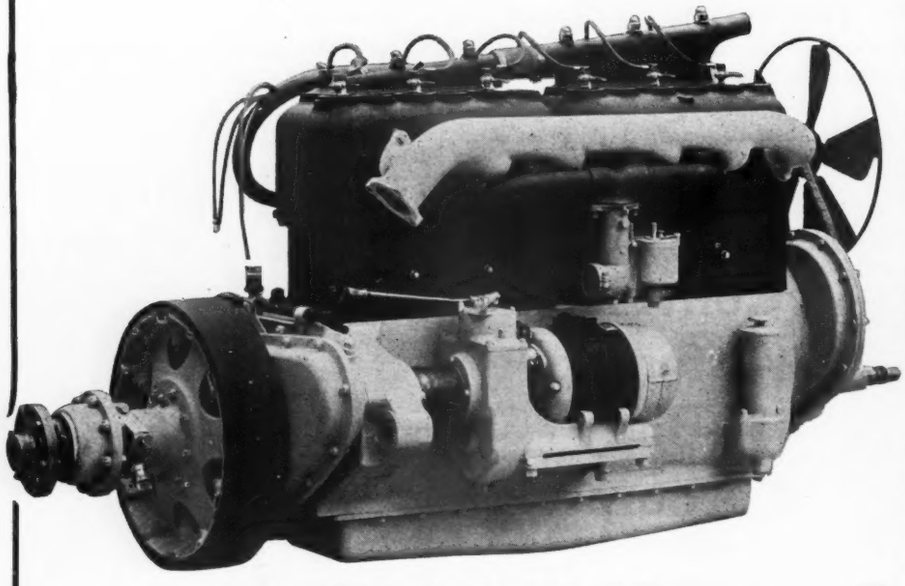
Announcing
THE MARMON "41"—$3250

The Marmon 41 is a six-cylinder car of ample power, moderate size and reasonable price. Not only is it in all respects worthy of the Marmon name, but it is of such character that it should add to the world-wide prestige of builders famous for the quality of their motor cars. Certainly it is the finest example of their well-known skill in design and intelligent care in manufacture. A better car could not be built.

Marmon accuracy has become the ideal standard of shop practice in the automobile industry, just as the Marmon oiling system, the Marmon pressed steel axle housing, accessible differential and other features of Marmon design have become standard with many of the higher grade cars.

The Model 41 is not a hurried job either in design or construction. Nothing has been left to "inspiration," accident or guess-work. Logical design, gruelling test and the most minute care have marked every stage of its growth to a completed car. Correct proportions of weight and power, selected and thrice tested materials and the finest of workmanship make it safe and reliable at the highest speeds and under the heaviest strains, and with intelligent handling it will give the best of service for years to come. The motor is a marvel of velvety smoothness and silent power. The last possibility of noise has been eliminated by having the cam shaft and valve tappets operated in circulating oil baths. This is but one of numerous new and minute refinements embodied in this model.

As a matter of course the electrical equipment for starting and lighting and all the manifold conveniences and luxuries known to motordom—and many that have been heretofore unknown—are found in this model and are the best that can be obtained. The final result is a remarkably easy riding, silent and beautiful car that will carry five passengers in comfort and luxury over any kind of roads and grades, that will throttle down to a crawl or go at breathless speed, without shifting gears, and a car that should be as good for many years in the future as it is today.



The Marmon "Thirty Two"

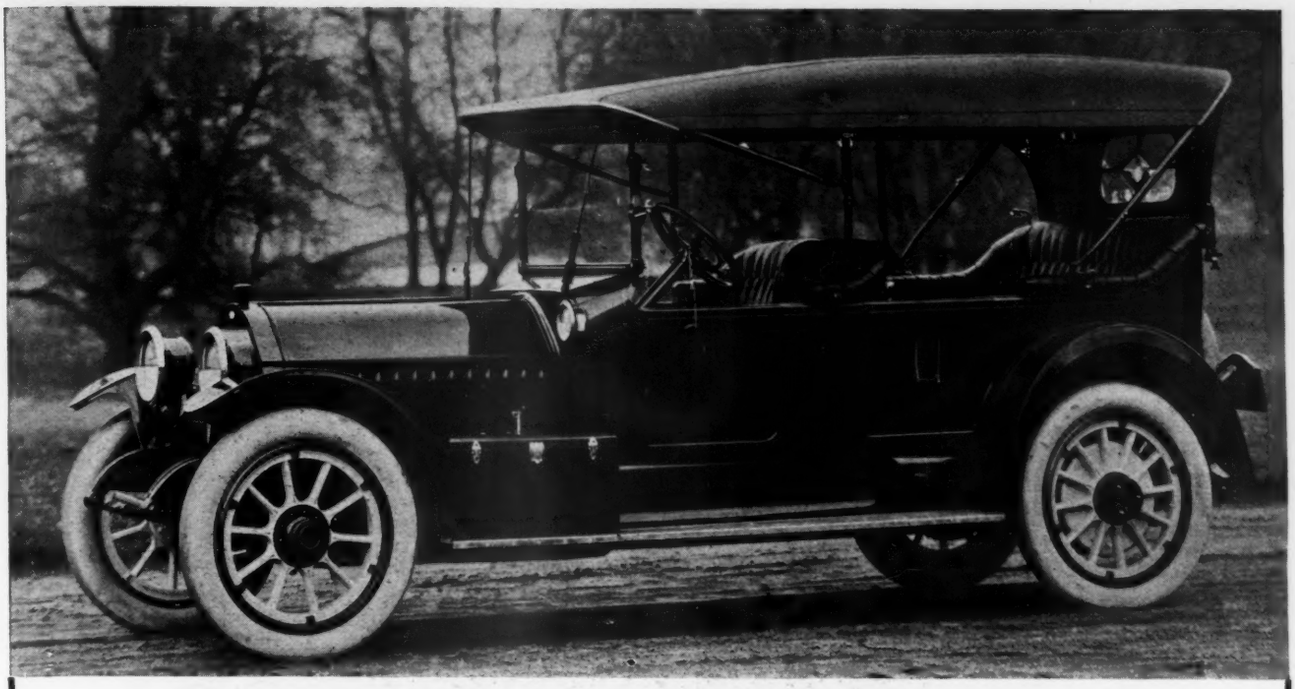
Price, $3,000. Four-cylinder, 32-40 h. p., 120-inch wheel base, body types and equipment to meet every requirement. A rational, logical car for touring and city use. Years of satisfactory service have proved its economy in tires, fuel, and upkeep plus smooth, delightful operation and durability.

The Marmon "Forty Eight"

Price, $5,000. Six-cylinder, 48-80 h. p., 145-inch wheel base with short turning ability eliminating the old objections to long wheel base. Body types and equipment to meet every requirement. The only big car with small-car advantages. Wonderful riding qualities and surpassing power and flexibility. A car developed by years of exacting tests.

Nordyke & Marmon Co.

INDIANAPOLIS (Established - 1851) INDIANA



Outline Specifications of

THE MARMON "41"—$3250

FRAME. Pressed steel. Double drop, affording ample spring clearance combined with low center of gravity. The side members are six inches maximum depth.

MOTOR. Water cooled, six cylinder, L-head, vertical, cast in blocks of three with enclosed valves. Bore 4¼ inches, stroke 5½ inches. Seven bearing crank shaft.

HORSE POWER. 41 to 70.

OILING. Marmon system of automatic force feed lubrication in motor, delivering oil directly into all bearings. Oil thrown off by movement of cranks lubricates the walls of the cylinders and the pistons. The cam shaft and valve tappets operate in circulating oil baths. The oil is carried in a reservoir below the sweep of the cranks passing through a screen and is used over and over. There is no splash or churning of oil. The oil consumption, friction and wear are reduced to a minimum.

IGNITION. High tension magneto and dry battery for starting. Dual system. Single coil with lock on dash.

TRANSMISSION. Selective type sliding gear arranged very compactly in a dust-proof, oil-tight case mounted central on three-point support. Three speeds forward and reverse.

CLUTCH. Asbestos fabric faced cone clutch with adjustable "pick-up" springs under the fabric.

DRIVE. Straight line shaft drive.

REAR AXLE. Full floating type. Pressed steel housing, with bevel gear differential easy of access through axle housing directly from the rear, both features being original and first used in the Marmon.

FRONT AXLE. Forged steel I section. Weight carried by conical thrust bearings. Conical roller wheel bearings. Yokes and steering arms are alloy steel forgings given special heat treatment. Cross connection back of axle.

BRAKES. One set, integral expanding 17 inches diameter by 2½ inch face and one set external contracting 17½ inch diameter by 2½ inch face.

WHEEL BASE. 132 inches. Tread 56½ inches. Clearance 10 inches.

WHEELS. Wood artillery. Interlocked spokes.

RIMS. Quick detachable, demountable. One extra rim supplied.

TIRES. 35x5 front and rear.

STEERING GEAR. Irreversible worm and worm wheel construction. Large bearings with ample provision for lubrication. 18 inch steering wheel with solid spider and grip. Horn button in center on top of wheel. Column of large diameter enameled black, as is also the wheel spider.

CONTROLS. Left hand drive, center control levers. Improved spark and throttle levers on steering wheel held by friction.

CARBURETOR. Automatic float feed with control from dash for starting.

GASOLINE TANK. Seamless steel. Capacity 25 gallons. Tank suspended from rear end of main frame side members.

RADIATOR. Cellular, mounted on a trunnion.

SPRINGS. Self lubricating. Front, semi-elliptic, 2 inches wide by 39 inches long. Rear, three-quarter elliptic, 2¼ inches wide by 57 inches long.

BODY. Convex curve type, of very substantial sheet metal construction. Concealed hinges. Doors open forward. Cowl dash with mahogany board on which the coil, speedometer, clock, air and oil gauges, and carburetor control are very neatly flush mounted convenient to driver.

FINISH. Blue black bodies with fine lined cream stripe, running gears the same with wheels painted cream color striped in black. Nickel trimmings.

UPHOLSTERING. Best of genuine black leather; coil, spring backs, spring edge cushions, best of white curled hair. Leather welts and binding. Deep and luxurious cushions. Tufted upholstering.

CARRYING SPACE. Commodious box on right front fender with corresponding tool box on the left front fender. Space under front seat with drop door in tonneau. Pockets in tonneau doors.

EQUIPMENT. Electric starting and lighting system with storage battery easy of access, mounted under front seat; large electric head lamps, electric dash and tail lamps all with wiring concealed within the brackets. License plate holder in combination with tail light. Bulls-eyes in the rear of the dash lamps throw light on the running boards. Lamps black enamel with nickel finish. Electric dash lamp. Switch for lights conveniently mounted on heel board of front seat. Pantasote cape top with dust boot and curtain; dividing rain vision ventilating windshield, self supported from dash. Speedometer and clock mounted flush on dash with speedometer drive from gear on driving shaft underneath the car. Electric emergency lamp with long extension cord, electric horn mounted under hood with push button in center of steering wheel. Power tire pump mounted on motor. Shock absorbers and rebound straps mounted on rear axle. Muffler cut-out. Single tire carrier in rear substantially supported from ends of side frame members. One extra demountable rim. Coat rail, foot rest, assortment of tools, oiler, jack and tire repair kit.

PRICES.

Five Passenger Touring Car	$3250.00
Four Passenger Touring Car	3250.00
Two Passenger Roadster	3250.00
Speedster	3250.00
Limousine (seats seven)	4750.00
Chassis, without dash and rear fenders, but with front fenders, hood lighting system and lamps with standard chassis equipment, painted in lead	3000.00

Nordyke & Marmon Co.

INDIANAPOLIS (Established - 1851) INDIANA

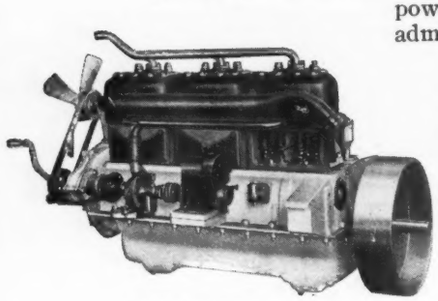
CHICAGO
SHOW
Space 26
COLISEUM
GALLERY

The Event of the Season

EVERY social function that brings together a representative company of men and women brings also an assemblage of representative motor cars. In a large measure every family is judged by the cars they ride in. Even the bride shares with the automobile which carries her away on her wedding journey the critical or admiring scrutiny of society. If her car is equipped with

THE RUTENBER MOTOR 1914 Six

its social recognition is assured. The new six cylinder Rutenber is the aristocrat among motors—the one motor whose supremacy is universally recognized and whose position is unchallenged. Judged by every standard of motor excellence, this achievement stands without a peer. Its efficiency, its silence, its power, its capacity for speed and endurance command admiration and inspire imitation.



Model 28, 1914 Six.

The Rutenber Motor, 1914 Six, costs somewhat more than other six cylinder automobile motors. It could not be what it is if it were cheapened in any way. But this slight increase in motor cost cuts little figure in the price of a high-grade motor car and it is borne by the manufacturer of the car rather than by the buyer.

You who aspire for intrinsic excellence and who know the value of genuine worth will serve yourselves best by selecting a car that is built around a RUTENBER Motor, 1914 Six

Write for the Rutenber Book.

RUTENBER MOTOR COMPANY
MARION INDIANA

Manufacturers

Here's an Accessory that Every Car Buyer will soon be Demanding

A Car Owner *Wants* a Top Lifter—He *Needs* a Robe Rail, Give Him Both—In One

No sensible car owner—whether he motors for pleasure or profit—is particularly delighted when it comes to raising or lowering the top. Usually the struggling and straining of at least two people many times leaves them both with a fit of "top temper." Now with the SIMPLEX combination, unhooking the robe rail and lifting the top is done in almost no time, and leaves nobody tired.

The only logical one-man top is the SIMPLEX ROBE RAIL TOP LIFTER used in connection with STANDARD FOUR UPRIGHT TOP.

The cost of the combination is very little more, Mr. Manufacturer, than what you pay for a good robe rail. WRITE US FOR TERMS, SAMPLE OR PERSONAL DEMONSTRATION.

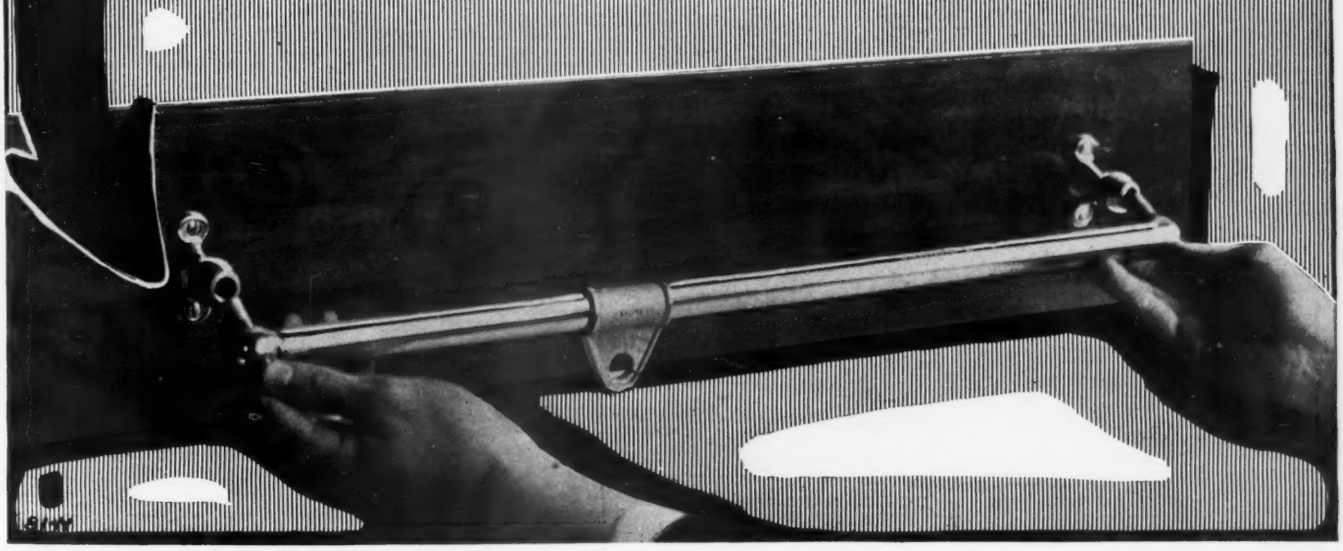
Dealers!

THE SIMPLEX COLLAPSIBLE TOP LIFTER—carried in the tool box—is having a tremendous success. It sells for $2.50 and is worth many times the price. Show the SIMPLEX AUTO TOP LIFTER to a car owner—tell him how it takes the trouble out of top lifting. Show him how it can be closed up and thrown in the tool box. Not only will he buy it—but his friends will fall in line.

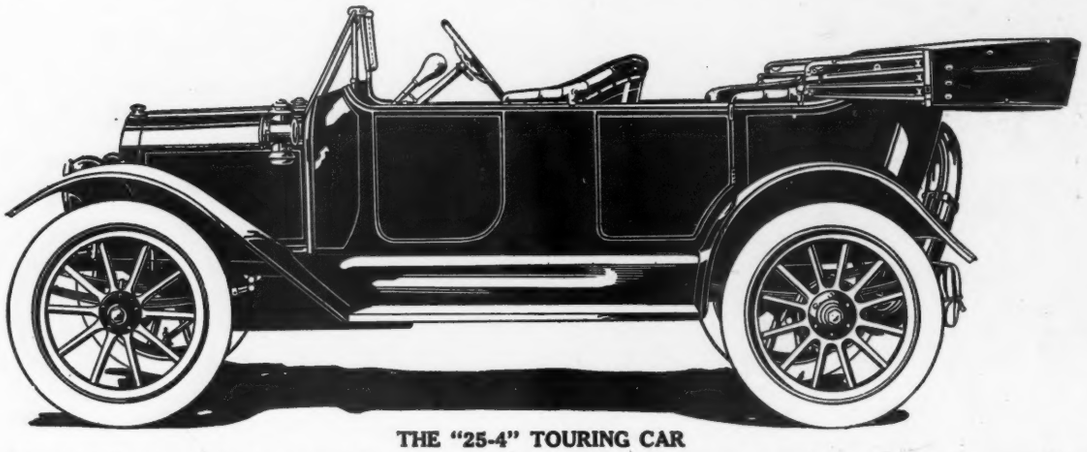
The retail price is very reasonable. Your profits are indeed liberal. Better get in touch with us *now*—before your territory is taken.

Simplex Specialties Company

69 Buhl Block **Detroit, Michigan**

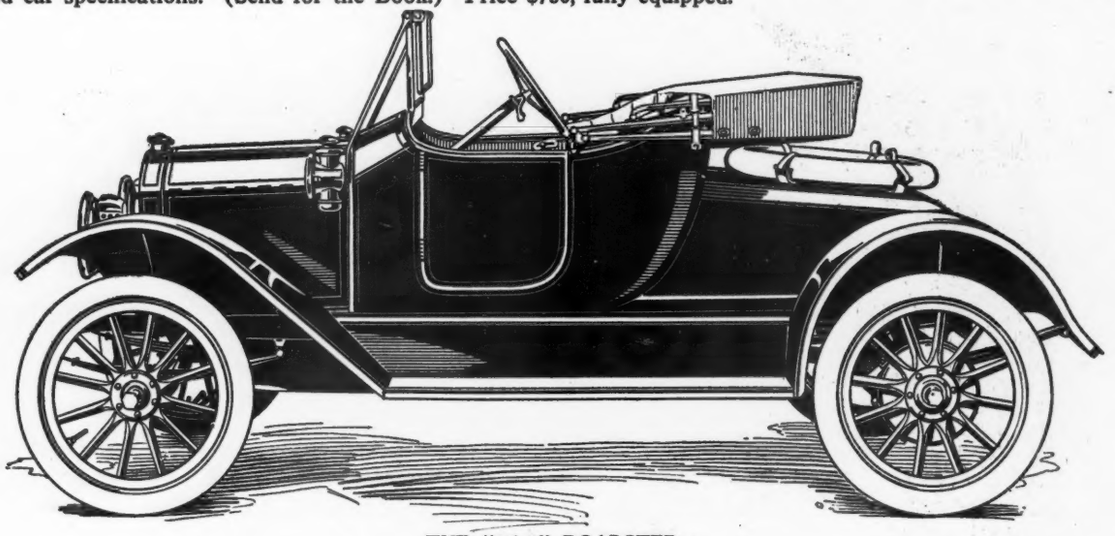


The Pioneer of the Past



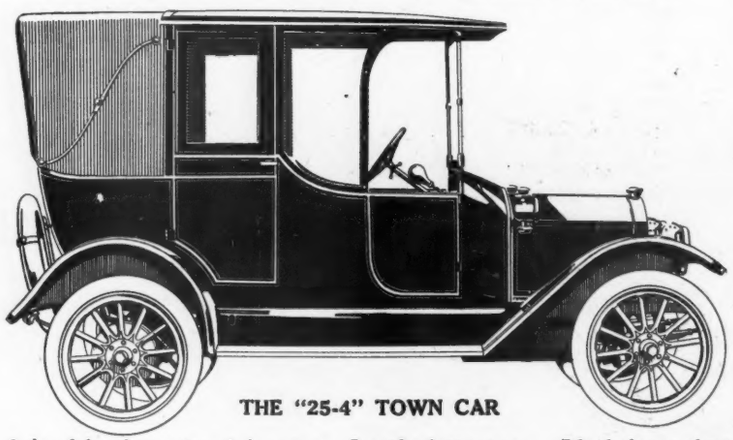
THE "25-4" TOURING CAR

Everything you have a right to expect in an automobile. Ample leg room, seating capacity for 5 full grown adults. So light that it will cut down the tire bills, and strong enough to withstand all the rough usage you are going to give it. Stream-line body design, left hand steer and other features you look for in the highest priced car specifications. (Send for the Book.) Price $750, fully equipped.



THE "25-4" ROADSTER

A natty, classy, speedy, two-passenger car that will go anywhere any car will go—and faster. Same chassis specifications as the touring car. (Send for the Book.) Price $725, fully equipped.



THE "25-4" TOWN CAR

Capacity, 6 persons—2 in driver's seat—4 in rear. Landaulette type. Ideal for a hundred kinds of service. Light, flexible and serviceable beyond any other at the upkeep cost. Same chassis specifications as the touring car. (Send for the Book.) Price $950, fully equipped.

—and of the Future

THE OLDEST, and yet the newest car in this Automobile Show is the Maxwell "25."

NO NAME DATES FARTHER BACK in this industry—and yet if you look where the crowd blocks the aisle, you'll agree that visitors consider the latest Maxwell—the "25-4"—the newest of them all.

TO SAY this $750 car is the "sensation" of the 1914 Show would be trite —tho true. It is more than that.

IT IS REVOLUTIONARY.

REVOLUTIONARY, because, never before has it been possible to obtain a car of such size, such capacity, such power, such performance and of such quality throughout as you will see in this Maxwell "25" at the price—$750 fully equipped.

REVOLUTIONARY, TOO, BECAUSE, maintenance cost has been reduced to the minimum, by putting in this car the best steels known to science—thus making it light, yet practically indestructible. So you can now not only afford to buy, but to keep an automobile.

WE CALL IT an engineering triumph. And you'll agree we are justified when you recall that for years hundreds of thousands have been looking, hoping, waiting, for such a car at the price.

WE SAY THIS CAR is the Oldest car in the Show—because more years of experience; more combined engineering skill; more know-how have gone into it than ever went into any other automobile at the price.

AND, BACKING UP that experience; that skill; that know-how; is as much money as ever backed an automobile concern.

ADD TO THIS, honesty of purpose, pride, and a desire to make good and to deserve well at the hands of every owner—and you have the elements that combined have produced this car that is the wonder of the Show—that blocks the aisle in front of the exhibit and thereby is proclaimed the Newest as well as the Oldest car in the Show. The Pioneer of the past—and of the future—the Maxwell "25."

Maxwell Motor Company, Inc.

DEALERS AND SERVICE EVERYWHERE

Detroit, Mich.

STUTZ—the car that made good in a day

Montamarathon Tacoma | Santa Monica | Free for All Corona | **Elgin National Trophy** | Corona Road Race | Potlatch Trophy Tacoma | Inter-City Trophy Tacoma

STUTZ—the car that made good in a day

Sturdy Stutz Proclaimed Champion

The year 1913 was a period of splendid achievement for the Sturdy Stutz. It saw the Stutz outclass the most carefully built cars in the world, in the most severe tests ever attempted. Its permanent record stands chiseled in the annals of motor car making in unquestionable terms.

A year of triumphs

Since July 5, 1913, the Stutz has won seven consecutive road race victories. In these seven races, totaling 1847.86 miles of service at an average rate of 70 miles an hour, the performance of the Stutz has been the most consistent ever seen on American tracks.

Such a remarkable record is too convincing to be passed by. The triumph of the Stutz comes from building into the car the utmost stamina and endurance, with just the right balance between weight and power.

Built to endure

The years of grueling service on the race tracks and in private use, which the Stutz has undergone, have been an education to our designers and mechanics. As a result of these tests, they have learned just what must be put into a car to make it a permanent success, and all these things have been built into the Stutz.

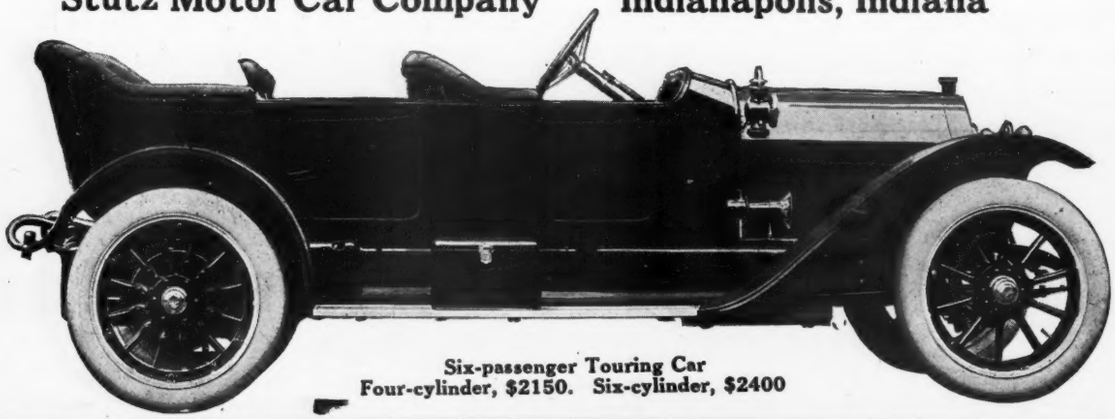
You get perfection of form as well as mechanical perfection when you buy your Stutz. Its stamina, sturdiness, beauty, roominess and comfort will please you always.

See the Stutz at the shows

The Stutz will be on exhibition at Space B-7 First Regiment Armory, Chicago, and Space B-10 Grand Central Palace, New York. Take the time to look it over carefully. You cannot afford not to know the facts about this truly remarkable car. Write for our new illustrated catalog, A-2, Series E.

Dealers We still have a little desirable territory open and have an interesting proposition to make responsible dealers. Write or wire quickly.

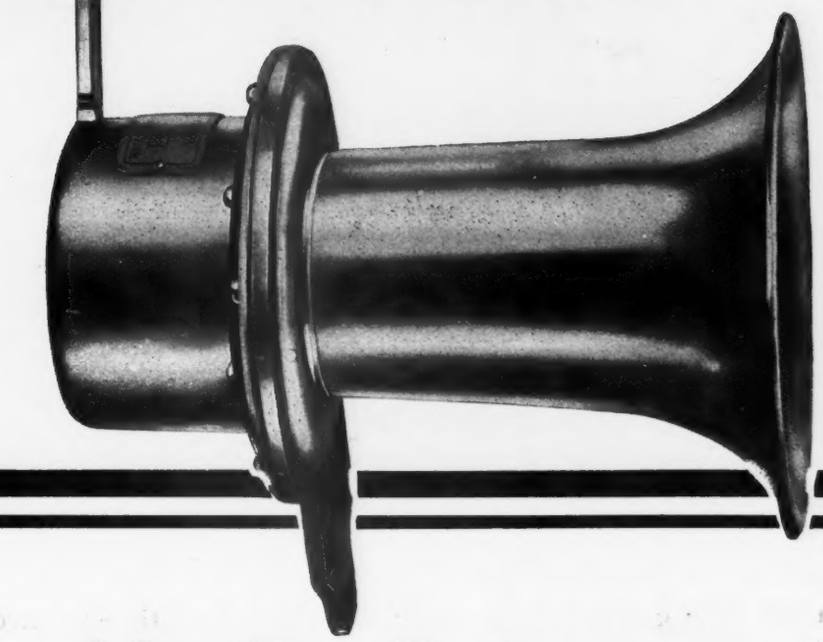
Stutz Motor Car Company **Indianapolis, Indiana**



Six-passenger Touring Car
Four-cylinder, $2150. Six-cylinder, $2400

LONG HORN

INVENTED BY G.F. LONG



Now a Johns-Manville Accessory with the Famous J-M Guarantee

THE well known efficiency of the Long Horn, manufactured by the G. Piel Company, has now received the endorsement of the H. W. Johns-Manville Company, who will hereafter control the selling and marketing policies.

That it has been selected from among the many makes of horns available by the H. W. Johns-Manville Company—that their choice has been the Long Horn only after a most exhaustive search of the market is evidence of its superiority.

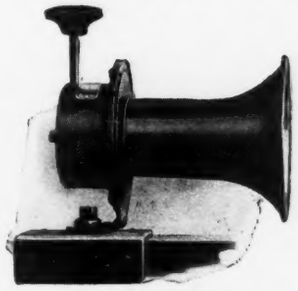
The outstanding feature of the Long Horn is RELIABILITY. It is mechanically operated. Its warning note depends on no delicate electrical apparatus, uncertain in its action and expensive to maintain. Its response to a touch of the hand or elbow on the knob is instantaneous and the volume of sound is completely under the operator's control.

All working parts are self-contained and practically wear-proof. It can be fixed in place in a few moments, involves no operating cost, and will outlast the car itself. Price $10 to $18.

Ask your dealer to show you the mechanism of the Long Horn. He sells it under the customary Johns-Manville Guarantee. That means the owner MUST be satisfied.

Write nearest Branch for booklet.

H. W. JOHNS-MANVILLE CO.



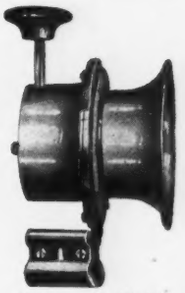
Junior Long Horn, Model "J.S." $10

Manufacturers and Marketers of Brake Lining, Spark Plugs, Electric Lamps, Speedometers, Horns, Fire Extinguishers, Dry Batteries, Vaporizers, Auto Locks, Fuses, Tapes, Etc.

Madison Ave. and 41st St. NEW YORK

Akron, Albany, Atlanta, Baltimore, Birmingham, Boston, Buffalo, Charlotte, Chicago, Cincinnati, Cleveland, Columbus, Dallas, Dayton, Denver, Detroit, Duluth, Galveston, Houghton, Houston, Indianapolis, Kansas City, Los Angeles, Louisville, Memphis, Milwaukee, Minneapolis, Newark, N. J., New Orleans, New York, Omaha, Philadelphia, Pittsburgh, Portland, Ore., Rochester, St. Louis, St. Paul, Salt Lake City, San Francisco, Seattle, Syracuse, Toledo, Washington, Wilkes-Barre, Youngstown.

The Canadian H. W. Johns-Manville Co., Ltd.
Toronto, Montreal, Winnipeg, Vancouver



Motorcycle Model "J-M"—$10

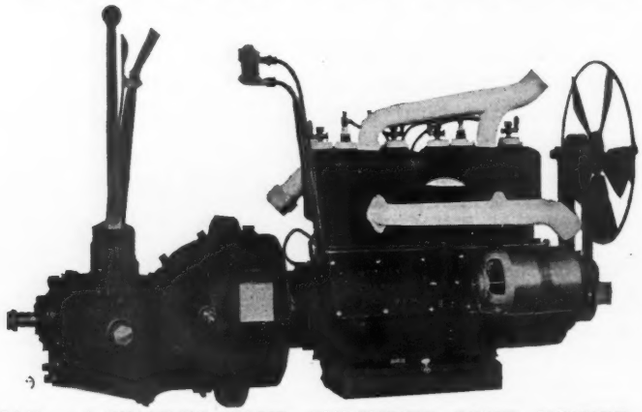
What's the biggest thing about a Motor Car?

"The motor itself," you answer instantly. Exactly. Because all else hinges upon that. No more than an athlete with sore legs can win a hard race can an automobile with a poor motor win in the battle of competition—with the prizes as big sales for manufacturer and good service to owner.

The motor is the true measure of every good quality in a car. It makes no difference whether you desire power, speed, endurance, flexibility or economy—the motor represents them all.

The standard of a good car is measured by its motor; the standard of a good motor is measured by

G. B. AND S. MOTOR



GOLDEN, BELKNAP and SWARTZ FOUR CYLINDER UNIT POWER PLANT has strength, sturdiness, accessibility. Its bore is 3¼" and stroke 4¼". It has features which should commend it to your attention.

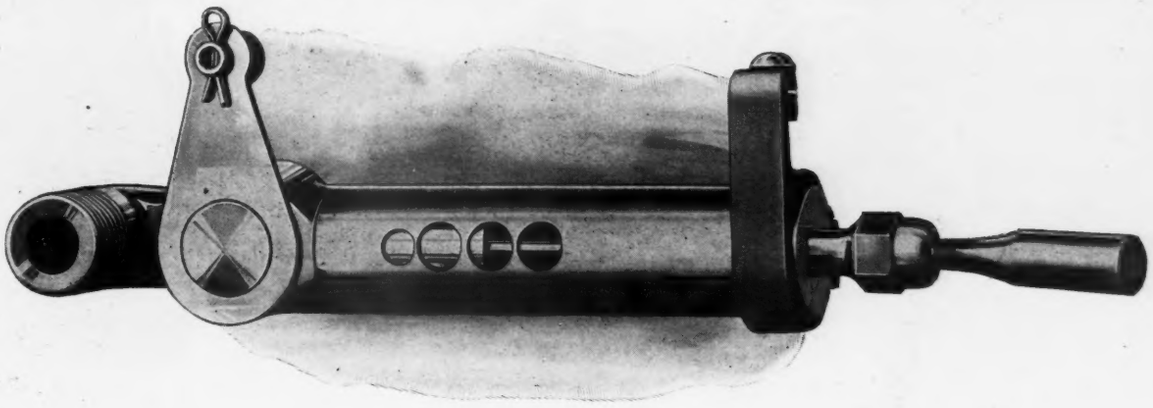
Take the clutch as an instance. It is perfect in operation, simple in construction and easy of adjustment. It picks up quickly and works smoothly. It has no superior anywhere.

The transmission is three speeds forward and one reverse—ball bearings throughout—⅞" face gears of special steel including center control and emergency brake levers (either right or left hand control). The four cylinders are of the L-head type cast in pairs. Instead of timing gears we use a silent chain drive for cam shaft and magneto which has been proved most efficient.

IF YOU ARE IN THE MARKET FOR MAXIMUM POWER PLANT EFFICIENCY YOU CANNOT AFFORD TO OVERLOOK THE VITAL THINGS THAT THE G. B. AND S. MOTOR CAN DO FOR YOU. AMONG OTHER THINGS IT WILL HELP MAKE GOOD THE GUARANTEE OF YOUR CAR.

Write for Detailed Information—Today.

GOLDEN, BELKNAP & SWARTZ CO., Detroit, Mich.



THE Empire Gasoline Economizer is not a fad; it is a scientific aid to better motor car service.

It is not a "knick-knack" to buy because you are an automobile enthusiast; it is a vital help to better efficiency.

The Economizer is built on as scientific a basis as is the carburetor; its work is just as important.

Air is mixed with gasoline to form the vapor which when exploded propels your motor car.

Air is just as necessary to the explosion as is the gas.

You can not explode liquid gasoline with a spark; it will only flame and there is no power in flame.

Because no carburetor has ever been made that controls the air at all speeds of your car, it is plain to see that somewhere the explosion approaches the "flame" point.

The carburetor is adjusted to certain speeds, weather, grade of gasoline, traffic conditions; etc.

There is no limit to the varying conditions that arise in just one mile of driving; and each variation calls for a different gasoline mixture.

Your carburetor is a "mixing pot" and is not intended as a "regulator" of the mixture.

The Empire Gasoline Economizer is an automatic regulator of the gas and air mixture; it acts **with** the throttle; meeting every condition to insure perfect combustion and the greatest power from the charge—

See what that means!

It means that, instead of increasing speed or power with added gasoline, it meets the additional task with added gasoline **and air.**

It controls the mixture; it holds back the rich gasoline vapor and mixes with that vapor additional air, to take care of the increased speed or power demand.

In other words it burns air. Absolutely.

Here's what you gain.

You get every possible bit of energy from each ounce of gasoline.

The cylinder walls and plugs are kept free from carbon caused by the smoke of too rich a mixture.

You get a hot spark at all times because of clean plugs.

You keep your engine cool—it's flame that heats an engine—and there is no flame.

You get more miles to the gallon of gasoline.

You save money—you get a higher efficiency from your car.

It costs $10.00.

Suppose you use 5 gallons of gasoline a day at 17 cents—that is $5.95 per week.

The Economizer will save you from 20% to 80%.

It will pay for itself in two weeks; in cash —and in ten miles; in satisfaction.

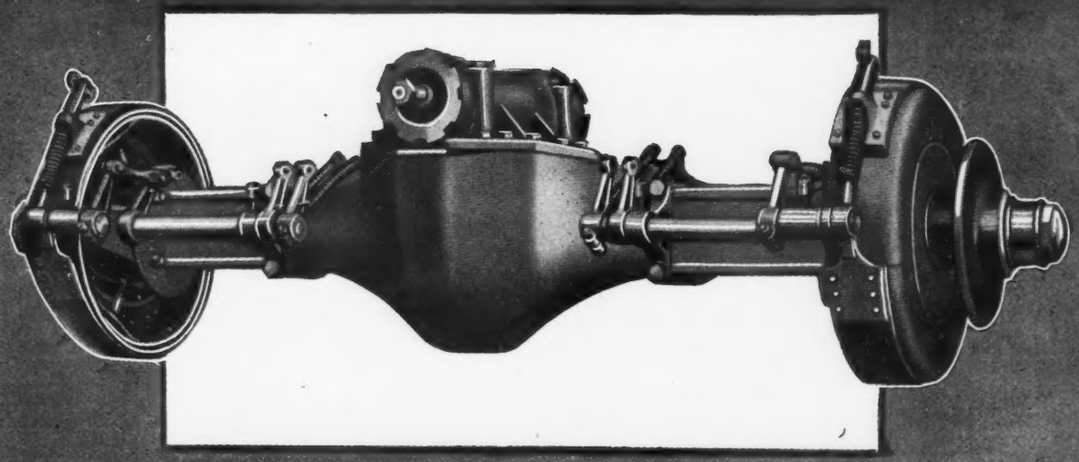
Write at once for our booklet on Motor Car Economy.

We've prepared it for the show, but we will send you an advance copy.

Sold on a Satisfaction Guarantee. Money back if it does not "make good."

BROWN-TAYLOR-GREENE COMPANY
1323-25 So. Michigan Avenue, Chicago, Ill.

We are closing with responsible agents for state rights.



It will pay YOU to BUILD SILENCE into YOUR TRUCKS

You Can Do It Best—and Most Economically—With—

SHELDON WORM GEAR DRIVE

The day is now in sight when the discriminating motor truck buyer will insist upon worm drive. He realizes that the elimination of noise means increased efficiency. He knows that the worm drive is not dependent upon delicate adjustments, and that its efficiency actually increases in service. Wear in any other form of drive causes extreme noise, does *not* have this effect upon the worm and worm wheel.

All the quality of design and workmanship that has made SHELDON SPRINGS and SHELDON AXLES famous is built into SHELDON WORM DRIVES. The worm is almost indestructible and will stand years of wear; the wheel is of phosphor bronze. SHELDON KNOWLEDGE and SHELDON EXPERIENCE make these the best obtainable.

In addition to the silence of the truck, think of the *neatness*, the *simplicity*, the *efficiency*—that are distinct advantages of the worm drive.

Remember that *every noted European manufacturer of commercial vehicles is using worm drive.* These European manufacturers have proved that the long life, quiet running and high efficiency of the worm drive are sufficient reasons for its use on their trucks.

And if you desire still further evidence of the desirability of worm drive as an asset to greater efficiency and increased sales value of *your* trucks—write us.

SHELDON AXLE COMPANY, Wilkesbarre, Pa.

Chicago Office	San Francisco Office	Detroit Office
68 E. 12th St.	444 Market St.	1215 Woodward Ave.

Overland

$950

Completely Equipped

With electric starter and generator—$1075
Prices f. o. b. Toledo

SPECIFICATIONS

Electric head, side, tail and dash lights
Storage battery
35 Horsepower motor
114-inch wheelbase
33x4 Q. D. tires
Three-quarter floating rear axle
Timken and Hyatt bearings
Deep upholstery
Brewster green body
nickel and aluminum trimmings
Mohair top, curtains and boot
Clear-Vision windshield
Stewart speedometer
Cowl dash
Electric horn
Flush U doors with concealed hinges

THE value of the cars and accessories of all the manufacturers exhibiting at the Grand Central Palace will be over $6,000,000.00.

But the value of the 1914 Overland business will be nearly $60,000,000.00—ten times as great.

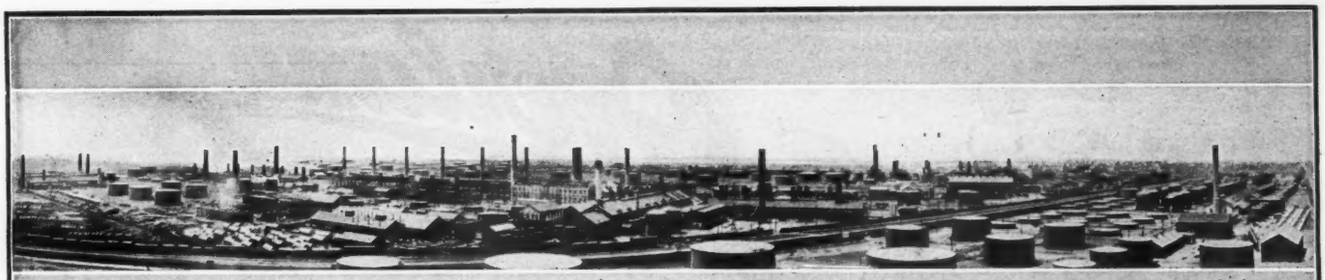
And the Overland factories to take care of this tremendous business are 40 times as large as the Grand Central Palace, in New York City.

For catalogues address Department 46

The Willys-Overland Company

TOLEDO, OHIO

Manufacturers of the famous Overland Delivery Wagons, Garford and Willys-Utility Trucks.
Full information on request.



Standard Oil Company Refinery, Whiting, Indiana

The World's Oil Specialists Make

Polarine

FRICTION REDUCING MOTOR OIL

The oil that maintains the correct lubricating body at any motor speed or heat, and flows equally well at zero.

The oil for use at high and low temperatures, and in every type and make of motor for pleasure and commercial use.

The Standard Oil Company, for 50 years, has studied all kinds of friction problems and supplied the proper oils to meet them.

Vast facilities and great resources are concentrated on producing the finest motor lubricant known.

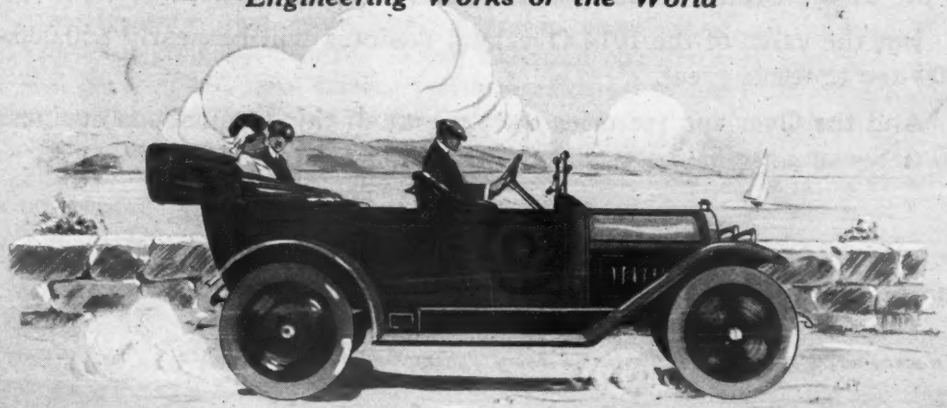
Polarine eliminates friction, saves upkeep cost and guards against quick depreciation. Motors in which Polarine is used bring the best prices on re-sale.

And gives the best service, and *longest* service, to those who want to keep them. Try it in *your* motor. See what it does.

Standard Oil Company

(AN INDIANA CORPORATION)

Makers of Special Lubricating Oils for Leading Industrial and Engineering Works of the World



One Million Cars Prove the Truth About Lighting

Most of them, over four-fifths of the million, are gas lighted.

Those that are lighted with electricity are contributing even stronger proof why gas lighting is more economical, most efficient, just as convenient and far safer.

Investigate carefully before you buy your new car. It will save you time, money and trouble if you use the coupon below.

Economy

Absolute proof in actual tests and service show that electric lights cost you five times more than Prest-O-Lite. Evidence awaits you. Get it.

Efficiency

The candle power of the electric lamp bulb is about half that of the naked flame of gas lighting. If you want only a dazzling beam, half a mile down the road, you can get it with a parabolic reflector. But experienced drivers prefer gas lamps that show the road immediately in front of the car where it is needed.

Convenience

With the Prest-O-Liter and Automatic Reducing Valve, gas lighting offers every "push-the-button" convenience. You can light or extinguish any or all the lamps on your car from the seat.

Safety

Here is a quotation from one paper—

"Seventy-five per cent. of the collisions that have taken place in the night time in San Francisco of late, can be laid to the glare of the electric headlights of the modern car."—Pacific Motor, San Francisco.

The coupon brings added proof. Use it!

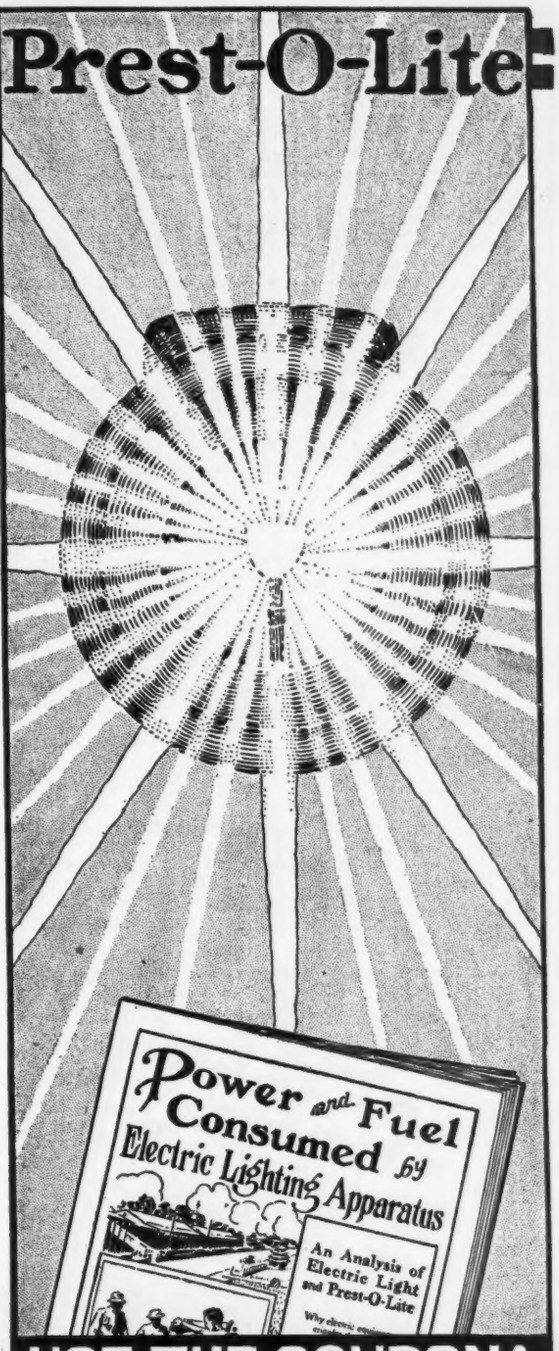
DEALERS ***Every day we are hearing from a few practical dealers, who have sunk profits in trying to make electric lighting equipment live up to the maker's claims. We have a special message for the wise dealer who can see ahead of today—who is figuring on the future. Ask for it.***

The Prest-O-Lite Co., Inc. 233 SPEEDWAY INDIANAPOLIS, IND.

Exchange Agencies Everywhere

(Contributor to Lincoln Highway)

Prest-O-Lite



USE THE COUPON!

The Prest-O-Lite Co., Inc.,

233 Speedway, Indianapolis, Ind.

Please send the Facts about ALL Lighting Systems to—

.....

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Efficiency, Not Cost, Determines The Value of a Starting System

The most vital part of the modern car is the electric equipment. It must be of high quality, it should embody the finest workmanship—the very best material.

Otherwise it will not, can not give service nor outlive the car. Tires may go wrong, the magneto may falter, other accessories may prove troublesome, but the starting-lighting system must not fail.

There are cheap starters, there are good starters. In selecting a system, quality should govern the purchase, not cost. The—

GRAY & DAVIS
STARTING - LIGHTING SYSTEM

possesses the highest grade of material, it is produced in the largest factory of its kind in the world, it may cost a trifle more but the cost comes out in the service that this system gives in all kinds of weather, under all conditions.

Write for Catalog

GRAY & DAVIS, Inc., **Boston, Mass.**

Dealers if the poppet-valved engine you are now selling will not—

pick up instantly, just like an electric motor, without choking or pounding, engage the clutch without a jerk and feed oil under pressure in just right amount necessary—

If you are compelled to speed up and rush at a hill instead of taking it easy and climbing steadily up the grade without a kick, a murmur or a struggle from the engine—

If you can not slow down without changing gears, and then throw the throttle wide open and secure an instantaneous response—

If your car is not marvelously free from vibration and noise at any speed—

If it will not do all these things, and in addition has no springs to weaken, no cams and timing gears to wear, no valves to clog or grind, no valve seats to warp, no delicate valve stems and tappets to get out of order—it is to your interest to at least investigate the .

Moline-Knight

Learn the truth about motors. Write at once for our Advance Information Folder—it contains description, specifications and illustrations. In requesting advance folder, you obligate yourself in no way—so get in touch with us immediately before our output is allotted.

See the Moline-Knight at the big Auto Shows

Moline Automobile Co.

500 Willow Street
East Moline, Ill.

Four-cylinder, five-passenger, 50 B.H.P. 128-inch wheelbase, Bosch Ignition, Wagner Electric Starting and Lighting, Price, $2400. Wire wheels extra.

The "Four" that makes the "Six" unnecessary

MOLINE KNIGHT

SAVED—DOLLARS—SAVED

In Automobile Fire Insurance Preminums

IF YOU ARE AWAKE

Brass and Nickel-plated Pyrene Fire Extinguishers are the only one-quart fire extinguishers included in the lists of approved Fire Appliances issued by the National Board of Fire Underwriters.

Size 14 inches long, 3 inches in diameter, Weight 5 lbs. (filled ready for use).

You will take advantage of the fact that if you equip your automobile with a Pyrene Fire Extinguisher—

You Can Save Money

¶ The reduction in rate calls for an Extinguisher—"one-quart, pump-type, approved by the National Board of Fire Underwriters" or "a device approved for this purpose by the Underwriters' Laboratories."

¶ Pyrene nickel-plated and brass extinguishers are the only types that qualify for this reduction.

Two facts will make the Pyrene Fire Extinguisher a standard part of motor car equipment:

1st. **The 15% Reduction in Fire Premiums.**
2nd. **The fact that Pyrene is the most efficient Extinguisher known to science, and the only practical extinguisher of the peculiar fires that occur in automobiles.**

The Ætna Accident and Liability Company and the Automobile Insurance Company of Hartford, Conn. allow this reduction—See their agents.

Pyrene TRADE MARK FIRE EXTINGUISHERS

Alton	Chicago	Duluth	New Orleans	Richmond
Atlanta	Cincinnati	Honolulu	Norfolk	St. Louis
Baltimore	Cleveland	Jacksonville	Oklahoma City	St. Paul
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Bridgeport	Denver	Memphis	Phoenix	San Antonio
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PACIFIC COAST DISTRIBUTORS: GORHAM ENGINEERING CO., San Francisco, Los Angeles, Seattle
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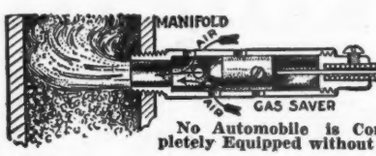


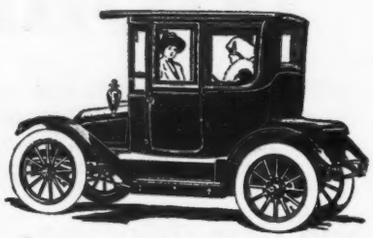
No Automobile is Completely Equipped without it.

BIG
REDUCTION IN PRICE
on
STEWART
GAS SAVERS

$5.00 for Motors up to 40 Horsepower
$6.00 for Larger Motors

Saves up to 40% *20% Guaranteed*
Increases Power
Saves Your Brakes
Increases Speed

HALLIWELL CO.
408 West Pico St. Los Angeles, Cal.



Buffalo Electrics

"The car you always admire"

SERVING a distinct need, Buffalo Electrics stand alone as the town car. Their claim to the place they occupy is based upon exclusive features—three point motor suspension—direct drive—noiseless running and the wonderfully simple foot control.

That's only a few points. Our catalogue explains others. Send us your name—today.

Special inducements in localities where we are not represented.

BUFFALO ELECTRIC VEHICLE COMPANY
Successors to Babcock Electric Carriage Co.
1219 Main Street Buffalo, N. Y.

Ask the Engineering Department of *Your* Car About

Easiest to apply. Merely clamp coil to frame and secure belting around axle. Nothing to work loose, rattle or wear out. No future readjustment required. Snubbers allow the springs to work naturally on the closing movement, but retard abrupt or excessive expansion; prevent the snappy rebound that jars mechanism and passengers; put a stop to excessive up and down movement of springs.

GABRIEL SNUBBERS

—they know, for they have fully tested them and know their merits.

Gabriel Snubbers are Standard Factory Equipment on White, Oldsmobile, Peerless, Stearns and Lozier; Partial or Special Equipment on over twenty other makes.

On Small Cars, Just as on Large Ones
Snubbers pay for themselves many times over in easy riding, reducing upkeep expense and adding to the length of service of your car.

Ask the Engineers!

GABRIEL HORN MFG. CO., 1415 East 40th St., Cleveland, Ohio

Makers of the Famous GABRIEL MUSICAL HORNS and WINDSHIELD CLEANERS

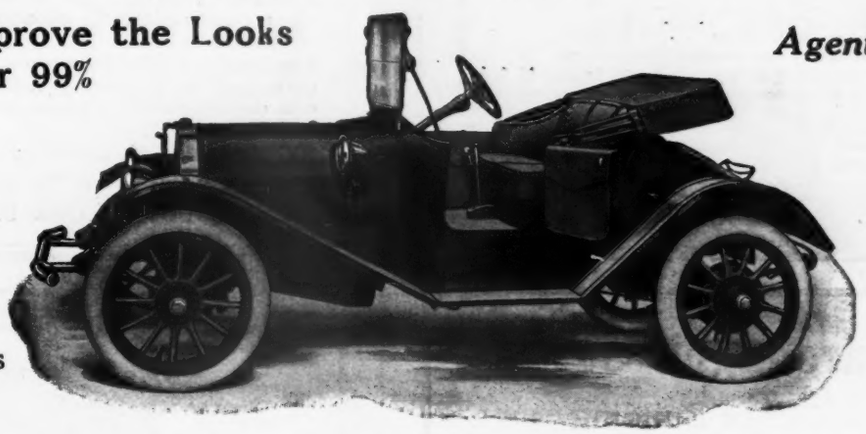
"CAMPBELL" ACCESSORIES

WATERPROOF SEAT COVERS for Autos

LET Us Improve the Looks of Your Car 99%

Agents Wanted

Guaranteed to FIT.
Best materials used and cut over our own special patterns



We have special patterns for **Ford, Buick, Hudson, Hupmobile, Studebaker, Cadillac, Overland, Maxwell, Reo, Paige,** and many other makes of automobiles.

See Us at New York Show—4th Floor—D-37

SEE OUR NEW FORD SPECIALTIES

The Perkins-Campbell Company, 622 B'way, Cincinnati, O.

Buy Better Springs

Guaranteed against breakage and sagging at less price than of car factories. Freight allowed on four or more. In stock, painted for Ford, Buick, Cadillac, Chalmers, Hudson, Maxwell, Regal, Reo, and others.

Send for complete list and price

NEW ERA SPRING & SPECIALTY COMPANY
247 Jefferson Ave., Detroit.

HERZ PLUG

"BOUGIE MERCEDES"

BLUE STONE & STEEL
Guaranteed One Year
Your Dealer or HERZ & CO. New York

AUTOMOBILE

SPRINGS

THE PERFECTION SPRING CO.
Cleveland Ohio

Dorris

Built to Last

THE SILENT CAR
BUILT TO LAST
Attention, Agents!!

We are offering a big, liberal proposition and unusual sales help to Agents on the

1914 Dorris Truck & Pleasure Car
We sell "through" the dealer and not "to" him. Write today.
DORRIS MOTOR CAR COMPANY St. Louis, Mo.

Herreshoff

Electric Self-Cranking
Electrically Lighted
Four Forward Speeds

The Herreshoff six was the first light six built and is today conceded the best example of skillful design in combining strength with reduced weight.

"Six-Forty" Touring Car and Roadster $1850—7 Passenger $1900
Model 4—30 Touring Car • $1350
Model 4—30 Coupe • • $1650
Model 4—30 Roadster • $1250

Live-Wire Dealers Write for Unallotted Territory.

HERRESHOFF MOTOR CO., Detroit, Mich., U.S.A.

The Thoroughbred Car

HESS AXLES

¶ HESS Axles have been on the market but 2 years. Fourteen car manufacturers in that short time exclusively adopted them as regular equipment.

¶ Renewals of HESS contracts for 1913 from past users and an increasing HESS demand among new manufacturers, is ample proof of the stability of HESS Quality.

¶ May we be of service to you? Write us.

THE HESS SPRING & AXLE COMPANY
Carthage, Ohio, U. S. A.

The Searchlight Gas Co.

1016 Karpen Building

CHICAGO, ILLINOIS

Stronger than ever, legally, financially and in the esteem of the trade. Watch us grow.

BRANCHES AND REFILLING STATIONS:

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Chicago, Ill.	Buffalo, N. Y.	New York City
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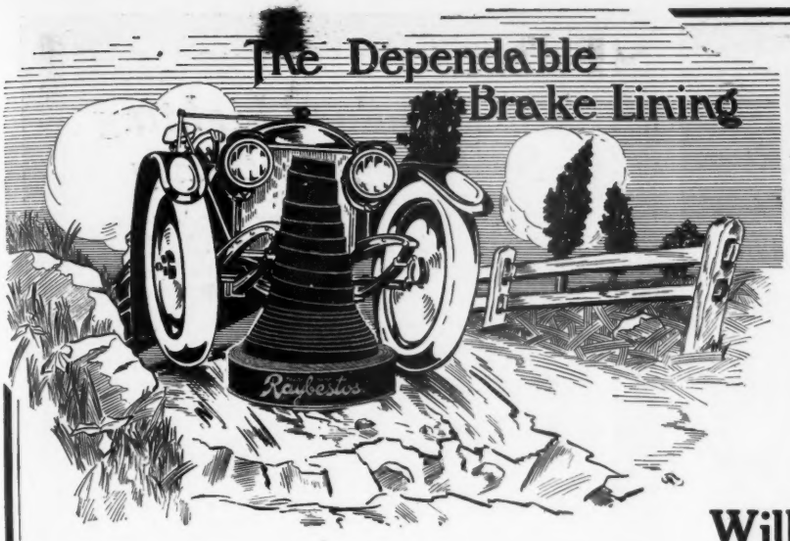
Philadelphia, Pa.	San Antonio, Tex.	Toronto, Canada
Kansas City, Mo.	Boston, Mass.	Indianapolis, Ind.

Ford
THE UNIVERSAL CAR

Model T Runabout.....$500
Model T Touring Car..... 550
Model T Town Car..... 750

With Full Equipment f. o. b. Detroit

FORD MOTOR COMPANY
Detroit, Michigan



A Cave-In On the Road

When the motorist swings round a sharp turn and discovers a yawning hole, he must get quick action with his brakes.

If they slip and slide on an inferior brake lining the car will go crashing and smashing to injury.

TRADE MARK **Raybestos** REG. U.S. PAT. OFF.

Will Always Stop the Car

It is the ORIGINAL asbestos brake lining—made of long fibre asbestos, woven and treated by our special process, which gives it great gripping power and durability.

Used on Packard, Pierce Arrow, Peerless, Stearns, Stutz, National, Premier, Knox, Stevens-Duryea and over one hundred other cars.

Install this thoroughly dependable brake lining with the name on every foot and "the SILVER edge which signifies quality and safety."

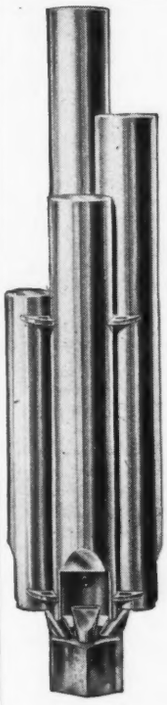
It is guaranteed to give better service than any others.

Write for Raybestos Booklet

THE ROYAL EQUIPMENT CO. 1352 Bostwick Ave. **Bridgeport, Conn.**

We make "Duplex" and "Raymond" Brakes. They are dependable—time-tried—economical.

Look for Raybestos at the New York Show, Space 55-56. Chicago Show, Space 80, Coliseum Gallery



It Is Self-Cleaning—It Is Clog Proof

The AERMORE Exhaust Horn

"The Horn Harmonious"

The problem of satisfactory signal service *ends* the minute you attach an AERMORE Horn to your exhaust. The horn is so *simple* it can't get out of order. It is *self-cleaning* and can't clog. You purchase no battery or wiring troubles with an AERMORE. No delicate mechanism here to aeroplane upkeep. Just a sturdy, serviceable, pleasant voiced horn, built to outlast any car it is put on. And you pay for an AERMORE but *once.*

The AERMORE is a "chime horn," musical, yet authoritative and insistent. It never frightens. It politely asks for the right of way, never raucously *demands* it.

It has two tones, one low, yet clear; another high, and far carrying. You can send a warning a mile ahead with an AERMORE if you want to.

It attaches to exhaust pipe. Made of brass tubes heavily nickel-plated. No complicated parts. Operated by foot pedal. Very easy to install. It comes with all fittings, ready to be put on car.

We are now prepared to supply an "AERMORE Special" for Ford cars. Price $5.50. Write for literature. Address Dept. M.

PRICES	
Size	
No. 1—15"	$10.00
No. 2—12"	9.00
No. 3—11"	8.00
Ford Special	5.50
No. 4—10" size for motorcycles	$5.50

The Fulton Company, Milwaukee, Wis.

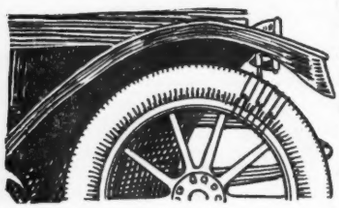
The R-A-B Wire Clamper will pay for its self on your first trip

PRICE, 65c

Tuck an R-A-B CLAMPER into your tool kit. Forget it till the next time your hose connections come uncoupled, or you have a blowout and want a hurry-up emergency repair. Then use it. If the CLAMPER doesn't do you more than 65 cents' worth of good, save you that much worth of time, trouble and cussing—send it back and we'll refund your money. We won't be satisfied unless you are.

Repairs Leaky Hose Connections, Blowouts, Broken Springs

This clamper enables **anyone** to put a wire clamp on **anything,** regardless of size. An ordinary piece of wire and the clamper turns the trick.



Used to Repair a Blowout

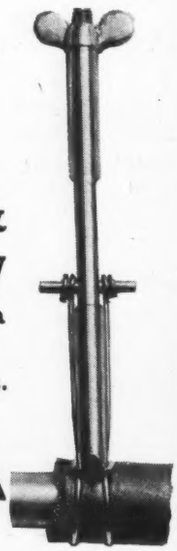
This little device makes a clean-cut clamp on which there are no projections to cut flesh or tear clothes. At its price it is a tool no repairman, garageman, or motorist should be without.

Price 65c

at all dealers', or sent prepaid on receipt of price.

R. A. Beaudette & Company

Chippewa Falls Wis.



Clamper in Use

Dealers!
Here's one of the fastest selling accessories on the market. Quick sales mean quick profit. Better get our handsome display card on your counter working for you. Write us about it.

The Standard Lighting System—Electricity

Practically all the new models are "electrically lighted throughout." Look around at the shows and note that nearly every car is equipped with this most satisfactory and efficient method of lighting—and the lamps used are

EDISON MAZDA Automobile Lamps

They are backed by MAZDA Service.

Irrespective of the lighting system adopted by the car builder, these lamps are part of the original equipment because of the successful and continued service they give with any particular lighting system.

It is this thorough reliability, whatever the conditions or whatever the lighting system, that has made the use of EDISON MAZDA Lamps so general.

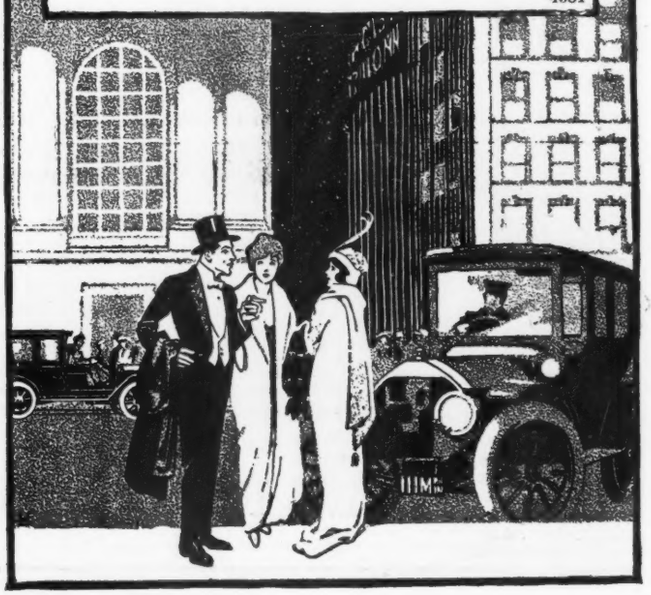
A few of the cars using this standard lamp are:

American	Imperial	Overland
American LaFrance Fire Engine	Interstate	Paige-Detroit
	Jackson	Pilot
Bailey Electric	Kline	Pope-Hartford
Chalmers	Lancia	Pratt
Chevrolet	Locomobile	Pullman
Cole	Lozier	S. G. V.
Columbus	Marmon	Seagrave
Cunningham	Maxwell	Simplex
Davis	Mercer	Stearns
Dorris	Michigan	Studebaker
Gramm-Bernstein	Moyer	Velie
Haynes	Norwalk	Winton
	Oldsmobile	Indian Motorcycle

If you want the same good service when replacing bulbs "be sure the lamps you buy bear the name EDISON."

EDISON LAMP WORKS
OF GENERAL ELECTRIC COMPANY
General Sales Office Harrison, New Jersey.

4581



Now It Takes Just Ten Seconds to Attach the

MAYO SPARK PLUG PUMP

By using the new MAYO QUICK DETACHABLE SPARK PLUG, either pump or spark plug can be *instantly* slipped in or out of the cylinder. Thumb and forefinger are the only tools required. No danger of breaking porcelains.

"The Spark Plug Core Slips Out—The Mayo Pump Slips In!"

The MAYO PLUG saves the time formerly taken for *screwing* the spark plug as well as the MAYO PUMP in and out of the cylinder. The MAYO QUICK DETACHABLE SPARK PLUG consists of an adapter which fits permanently into the cylinder, and a spark plug core. A pump connection to be attached to the base of the MAYO PUMP is furnished free with every MAYO PLUG. Price per plug, $1.50, (Extra. Not included in regular price of MAYO PUMP).

Old model MAYO PUMPS can be readily equipped with pump connections so that a MAYO QUICK DETACHABLE SPARK PLUG may be used.

You can try a Mayo Pump Free on Your Car for 30 Days.

Write for Particulars.

The 1914 Model MAYO PUMP offers several other unique improvements in which you will be interested.

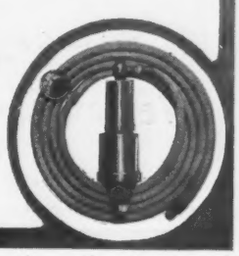
Complete With Gauge

Price $10.00

See us at the Shows—New York, Jan. 3-10, Palace, 4th Floor, Space D213. Chicago, Jan. 24-31, Coliseum Annex, 2nd Floor, Spaces 231-233.

$10

MAYO Mfg. Co.
55 East 18th St.
Chicago, Ill.



Do Your Own Welding!

Save time and money on repair jobs! Don't send out your repair work. You can now *do it yourself*—and save a lot of time for your customers and money for yourself.

Don't buy and wait for new parts! You can *make old parts as good as new* by using the

Cox Welding Outfit

(For Welding and Carbon Removing)

Complete in every detail. Will do every possible welding job. Very simple in construction. Can be used on parts of iron, steel, brass, bronze and aluminum. Any average mechanic can become adept in its use in a short time. We furnish complete instructions with each outfit. It is *safe* and *sure*. Every job you do means—*Extra Profit for You.*

The outfit will pay for itself many times over. It means quick repair work—and *all of it done in your shop!*

The Cox Outfit is not only excellent for welding, but it can also be used to *Quickly and Completely Remove Carbon from Cylinders!*

Thus you have a dual outfit—a profit maker two ways! Its use is doubled. It saves time in two ways—and produces two profits!

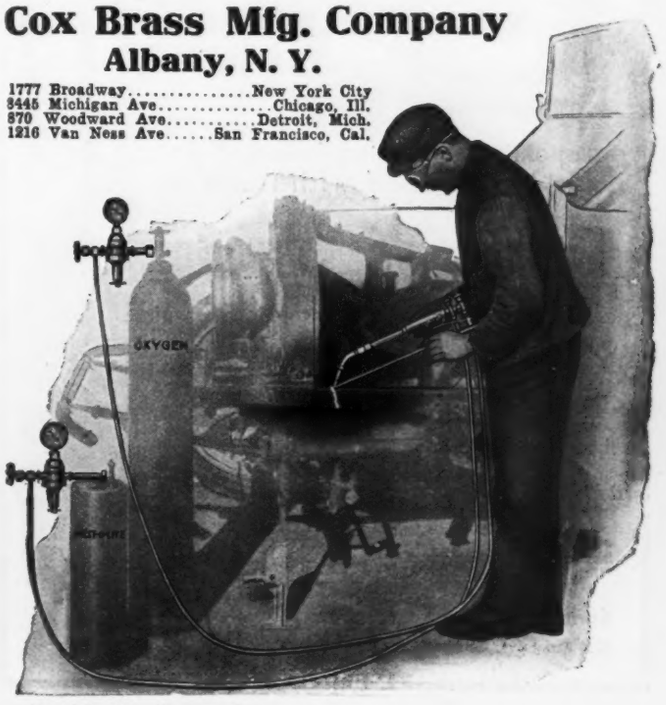
Send for free catalog and full information NOW

See our exhibit at the New York Show

Cox Brass Mfg. Company

Albany, N. Y.

1777 Broadway.....New York City
3445 Michigan Ave.....Chicago, Ill.
870 Woodward Ave.....Detroit, Mich.
1216 Van Ness Ave.....San Francisco, Cal.



You, too, will enjoy the luxury of a steady-running, never-missing motor the instant you install the

J-M Mezger Soot-Proof Spark Plug

This plug *never* short-circuits. It is made with a double chamber formed by a porcelain petticoat around the centre electrode. This petticoat extends to the end of the plug and is always so intensely hot when sparking that carbon is burned up the instant it settles.

Rapid changes of temperature will not crack the porcelain.

No soot—no short-circuiting—no broken porcelain—therefore no interruptions in service. Millions of these plugs have been sold.

Guarantee! If any plug does not give satisfactory service we will supply a new one or refund purchase price.

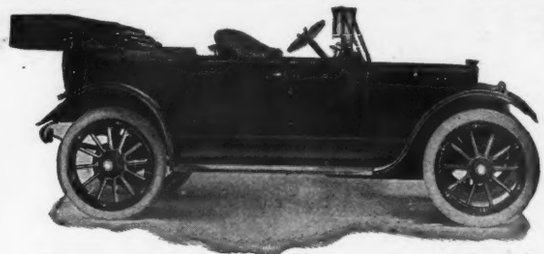
Price, $1.00. Shipped direct from our nearest Branch if not sold by your dealer. Write for interesting Booklet.

See our exhibit at New York Auto Show, Space D-3, fourth floor

H. W. JOHNS-MANVILLE CO.

Albany	Cincinnati	Kansas City	New Orleans	San Francisco
Baltimore	Cleveland	Los Angeles	New York	Seattle
Boston	Dallas	Louisville	Omaha	St. Louis
Buffalo	Detroit	Milwaukee	Philadelphia	Syracuse
Chicago	Indianapolis	Minneapolis	Pittsburgh	2219

THE CANADIAN H. W. JOHNS-MANVILLE CO., LIMITED,
Toronto Montreal Winnipeg Vancouver



Apperson Four Forty-five Touring Car—$1785

If you wish to make *quick, easy* sales, the Car you handle must have a *working, prosperous factory and organization behind it.*

And, furthermore, critical buyers will raise countless and unanswerable objections against any car *whose maker is now in financial difficulty or regarding whom there is the slightest whisper of impending trouble.*

The Apperson Brothers have been making the—

Famous Apperson "Jack Rabbit"

"THE WIZARD OF THE HILLS"

at Kokomo, Indiana, continually since 1893. They will *continue to manufacture cars* because of the merit of their product and their *reliable, sound business methods*—approved by hundreds of prosperous, prominent dealers.

Think it over!

Now and then a good territory is open for an aggressive and progressive dealer.

Address Department "B" for prompt attention.

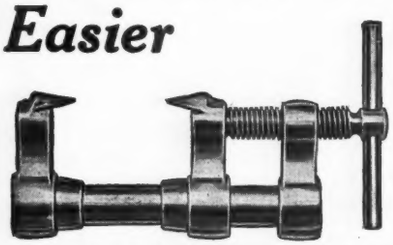
Light 4-45 Touring	$1600	4-45 Touring	$1785
Light 4-45 Roadster	1600	4-45 Sedan Limousine	2500
Light 4-45 Coupe	2350	6-45 Touring	2500

Apperson Bros. Automobile Co.

Kokomo, Indiana

CHICAGO 3300 Indiana Ave. **PORTLAND, OREGON** 58 No. Twenty-third St.

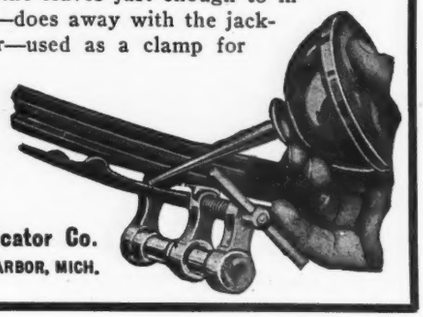
Make Your Car Ride Easier



GET 50 to 100 per cent more resiliency and longer life out of your springs by properly lubricating them. You can do it quickly and easily with the—

Knowlson's Spring Leaf Spreader

made of the highest grade drop forging, nickel plated, polished and well finished—adjustable to any size auto spring—separates the leaves just enough to insert the lubricant—does away with the jacking up of the car—used as a clamp for broken springs.



$1.50 all dealers or sent prepaid

Spring Leaf Lubricator Co.

1004 Forest Ave. ANN ARBOR, MICH.

Every Automobile and Garage Owner or Operator

should possess a reliable, durable, convenient Electrical Measuring Instrument

WESTON MODEL 280
Portable Testing Instrument

Weston Miniature Precision Ammeters and Voltmeters

FIT THE POCKET

and are in every way the most accurate, durable, reliable and altogether satisfactory for testing batteries and electrical circuits

Send for 30-page bulletin No. 8 describing these and other small instruments.

Weston Electrical Instrument Co.

NEWARK, N. J.

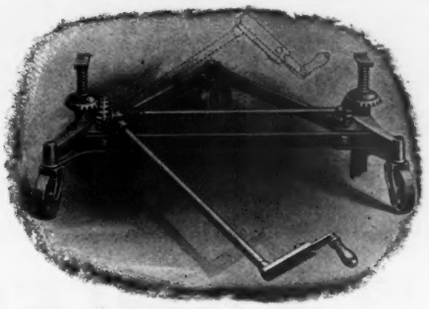
New York	Boston	Denver	Birmingham	Montreal
Philadelphia	San Francisco	Cleveland	Toronto	Paris
Chicago	St. Louis	Detroit	London	Berlin

There's Profit

in

Storing Cars and "Overhauling"

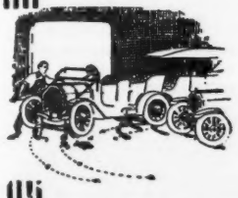
when you use



WEAVER
Auto Twin-Jacks

THE saving in **labor, floorspace** and **time** makes an equipment of these wonderful Jacks a source of revenue, and not an expense.

No matter how limited is your capital or resources, you **can't afford** to be **without** WEAVER Jacks in your—



STORAGE ROOM
REPAIR SHOP
SAMPLE ROOM
PAINT SHOP
or WASH ROOM

Wherever Autos have to be handled, WEAVER AUTO TWIN-JACKS are an absolute necessity, and a money-making institution, whether in Public or—

Private Garage

They are "part of the Auto" to the man who maintains his own private garage. Every car owner needs them as Tire Rests, Turn Table, Transporting Trucks and Lifting Jacks.

SEE THEM AT

NEW YORK and CHICAGO
SHOWS

They will be there strong

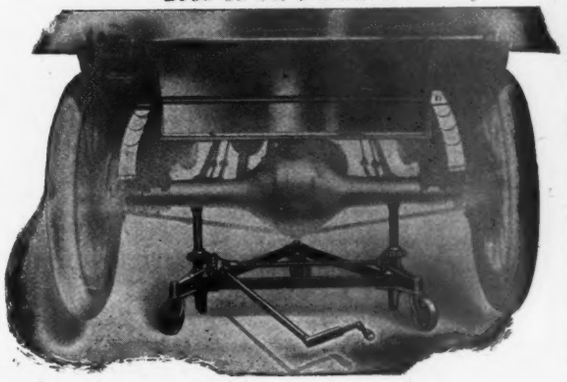
TWO for $20

(One for each axle)

LIBERAL DISCOUNTS TO DEALERS

Weaver Mfg. Co., Springfield, Ill.

2165-69 So. 9th Street



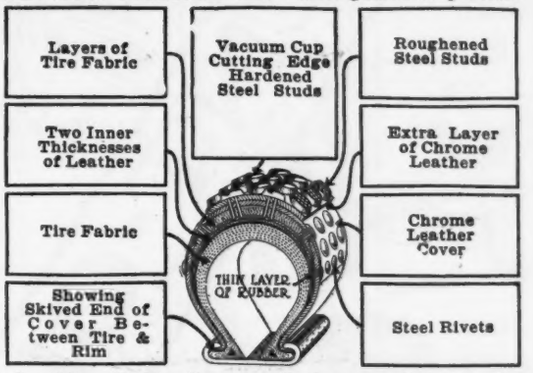
BRICTSON

GUARANTEED
PUNCTURE-PROOF
PNEUMATIC TIRES

GUARANTEED FOR 10,000 MILES

Puncture-proof—Blowout-proof—Skid-proof—Rut-proof—Rim-cut-proof—Oil-proof and most resilient

This shows construction that makes guarantee possible.


Layers of Tire Fabric
Vacuum Cup Cutting Edge Hardened Steel Studs
Roughened Steel Studs
Two Inner Thicknesses of Leather
Extra Layer of Chrome Leather
Tire Fabric
THIN LAYER OF RUBBER
Chrome Leather Cover
Showing Skived End of Cover Between Tire & Rim
Steel Rivets

A written 10,000 mile guarantee accompanies every tire.

10 Days' Free Trial

To remove all doubt that might arise in the purchaser's mind and to back up our statements we will allow 10 days' free trial on the first set that goes into each town and if these tires are not perfectly satisfactory in every way they may be returned to us any time within 10 days and we will cheerfully refund the entire purchase price.

BEFORE WE PLACE AN AGENCY WE WANT a set of these Brictson Tires in each town—who will be the first one to order?

We can rebuild your tires like this

If you are not in need of new tires and the fabric in your present tires is still good, we can rebuild them the Brictson way, making them puncture-proof—non-skidding—blowout-proof—and oil-proof and rim-cut-proof.

All the weak points in previous tire construction have been eliminated in the building of the Brictson Pneumatic Tires. No motorist can afford to pass by the opportunity to be relieved of all future tire troubles.

For full particulars as to how the Pneumatic Tire problem has been solved, fill out and mail the attached coupon.

THE BRICTSON MANUFACTURING CO.,
1214 Brictson Bldg., Brookings, S. D.

COUPON

The Brictson Mfg. Co., 1214 Brictson Bldg., Brookings, S. D.
Without obligation on my part, please send me full particulars about Brictson tires, also explain how you can rebuild my own tires the Brictson way.

Name.....

Address.....

Dealer's name.....

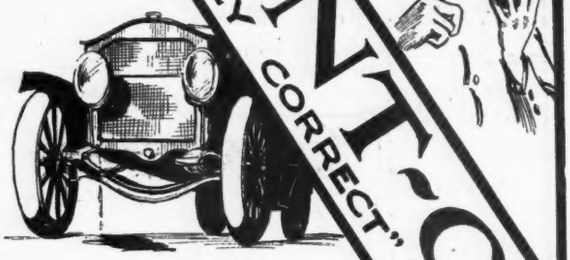
SE-MENT-OL

"CHEMICALLY CORRECT"

PLUG THAT RADIATOR LEAK PERMANENTLY

WITH

FINDS THE LEAK AND FIXES IT



Makers of BRASS-KOTE

THE NORTHWESTERN CHEMICAL CO. CHEMICALLY CORRECT SPECIALTIES MARIETTA, OHIO

WHEN YOU BUY AN AUTO TRUNK

Look for the Red "K" and Gold "Diamond" on the Front

The red and gold trade-mark shows that it's a genuine Kamlee—the handsomest, strongest, most convenient auto trunk ever made.

Light and flexible, yet tough and durable in the extreme, it fulfills ever requirement of the touring motorist. New air-tight interlocking edge makes

THE NEW KAMLEE

The Only Really Dust-Proof and Rain-Proof Auto Trunk

on the market. The edges lock together—rain or dust cannot enter anywhere. A rubber tubing at bottom of interlocking groove conforms to any irregularity or give in top and front. Contents thoroughly protected in any weather. Waterproof covering is fastened over top with patent spring-swivel nuts. No straps to bother with in opening. See it at your dealer's or write us for prices and descriptive booklet. We'll gladly send you a Kamlee on approval anywhere if your dealer can't supply you.

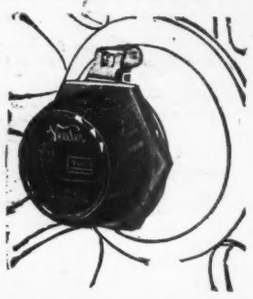
THE KAMLEE COMPANY
234 Broadway Milwaukee, Wis.

Veeder

"A Detail of Perfection"

is positively necessary in any instrument used to keep tabs on cost of upkeep. Tires, gasoline or "juice," and lubrication cost can only be correctly ascertained with the VEEDER HUB ODOMETER—a perfected instrument that can't be fooled with.

Neat, durable and compact, it can be easily attached. Price complete, $25.00



At your dealer's, direct from our factory, or at the following agencies:

T. H. Cranston & Co., 56 E. Randolph Street, Chicago, Ill.

Bernard I. Bill, 543 Golden Gate Avenue, San Francisco, Cal.

The Veeder Manufacturing Company
C. H. VEEDER, President D. J. POST, Treasurer
H. W. LESTER, Secretary
HARTFORD, CONN.

Makers of Cyclometers, Odometers, Tachometers, Tachodometers, Counters and Small Die Castings

DUELEC VAPORIZING PRIMER

DIFFICULT STARITNG OVERCOME

The DUELEC sends fuming gasoline right into your cylinders. The first spark explodes it, and off you go.

No unnecessary cranking or spinning. Your motor starts the same below zero as at 100 degrees.

The DUELEC saves current which is wasted by difficult starting. Then, too, it saves wear on your starter. This alone should commend it to you.

The DUELEC can be used on any automobile, marine or aeroplane engine, with gasoline, kerosene or denatured alcohol. It takes but an hour to install, all fittings included.

Get it from your dealers, or will send direct upon receipt of price—$10.00.

Try it for 30 Days

If by that time you can do without it, will take it back and refund your money.

Mr. Dealer: This is a big sales proposition, and if you are going to stock up with any vaporizing primer—and the demand will soon cause you to do so—you had better have one with U. S. Patent allowances. Your profits on a DUELEC are splendid — the article itself is thoroughly efficient.

DUELEC

14 North Broadway, Yonkers, N. Y.

PYRMA ALUMINUM MATTING

For Automobile Running Boards, Floor Boards, Motor Boat Floors, Etc.

It will not rust. Unlike rubber matting, oil or grease will neither stain nor rot it. It won't tarnish. It can be readily cleaned. Costs less and wears longer than any other kind of matting on the market. Can be cut with an ordinary pair of tinner's shears. Any one can apply it.

"LOOK FOR THE LITTLE PYRAMIDS"

For sale at all auto supply houses, or send us specifications direct and we will quote prices

METALLIC AUTOMOBILE MATTING COMPANY
ROCHESTER, N. Y.

Everyone marvels that such a brilliant light can be produced for from 300 to 420 hours by only six 30-amp. dry batteries.

You can have an efficient electric lighting system at one-third the operating cost of standard equipment by equipping your car with

J-M Mobilite Electric Lamps

These lamps are fitted with a special Tungsten bulb. The light is intensified by a powerful lens and reflector. Neat and attractive in appearance.

For head lights, dash lights, tail lights, speedometer light and for illuminating car interior. Also for motor boats, camps, etc.

Can be installed by any handy man.

If your dealer can't supply you, write our nearest branch.

Write anyhow for Booklet.

See our Exhibit at New York Auto Show, Space D-3, fourth floor.

H. W. JOHNS-MANVILLE CO.

Albany	Cincinnati	Kansas City	New Orleans	San Francisco
Baltimore	Cleveland	Los Angeles	New York	Seattle
Boston	Dallas	Louisville	Omaha	St. Louis
Buffalo	Detroit	Milwaukee	Philadelphia	Syracuse
Chicago	Indianapolis	Minneapolis	Pittsburgh	(2135)

THE CANADIAN H. W. JOHNS-MANVILLE CO., LIMITED
Toronto Montreal Winnipeg Vancouver

Starts — Lights — Ignites

REMY

Six Volt System—Does-It-All

AFTER inspecting the new cars at the coming Automobile Shows, you will insist on Remy equipment, not simply because it will crank engines, light the car or fire the engine, but BECAUSE:

This apparatus is designed by O. F. Conklin, the recognized authority on electrical apparatus for motor cars.

This apparatus is built under the factory management of *Men Who Know.*

The responsibility of the complete electrical apparatus is assumed by one reliable, experienced company.

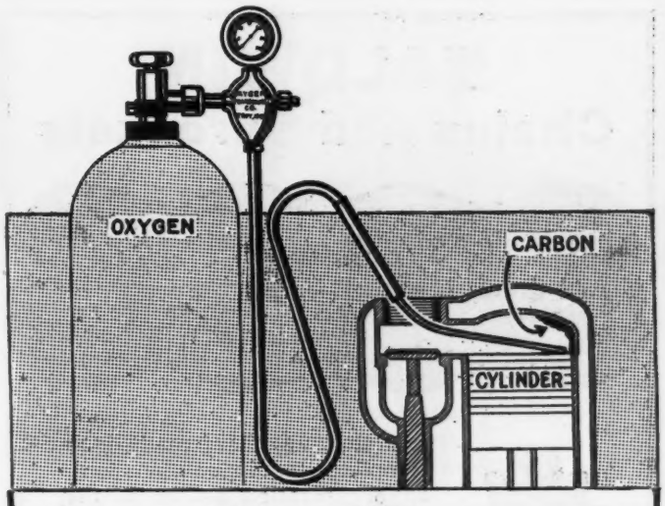
A country-wide system of quick and efficient service is available for Remy users.

We are the only concern building the complete apparatus, either as a whole or in any combination—starting motor—lighting equipment — magneto, or magneto type battery ignition (generator and storage battery). (The starting and lighting equipment is sold only to motor car makers.)

Write for our magneto (any make) exchange offer.

Remy Electric Company
General Offices and Works, Anderson, Indiana

BRANCHES:
New York Detroit Kansas City Minneapolis
Boston Chicago San Francisco
(Service Stations Throughout the Country)



Perfect Carbon Remover $10

Will remove *all* carbon from cylinders. Easily and in few minutes. Equal of any high-priced outfit. All parts guaranteed. Keeps up efficiency of cars and trucks. *Big money maker* for garages.

Price $10

(Without Oxygen Tank)

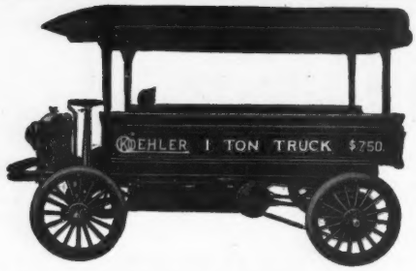
Usual price $15. As we sell for cash only and no accounts carried, customers are given $5.00 off on every outfit. Express companies allow inspection; you take no chances. Sent prepaid cash with order or C. O. D.

OXYGEN DECARBONIZER CO. 301 River St. TROY, N. Y.

SEND FOR INFORMATION

KOEHLER

ONE TON TRUCK $750.



24 H. P.
Bosch Magneto
36" Std. Dem. Tires
2" Axles

Ten Stock Body Types

DEALERS:—Sell a TON TRUCK of the reputation and proved efficiency of the KOEHLER—if you don't, you cannot hope to compete with the fortunate dealer who has it. Send for Catalog.

H. J. KOEHLER S. G. COMPANY
1709 Broadway, New York

STANDARD FOR 59 YEARS

1855 —— *1914*

Jones Wheels

"Best on Earth"

A broad statement, but we stand by it.

THE NAME OF JONES AS APPLIED TO WHEELS MEANS THE—

First—Last and All-the-Time Word In Wheels

"Kantsamore"

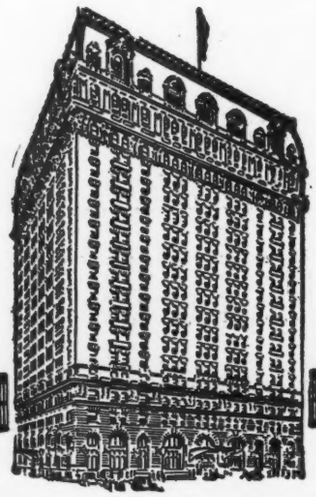
Buyers of Vehicles should say—
"Give me wheels made by

Phineas Jones & Company
Newark, New Jersey, U. S. A.

BALDWIN
Chains and Sprockets

run well together; made in a completely equipped plant with an organization skilled in the art by long experience. Manufacturers should have samples and prices of our chains, and allow us to quote on their blue prints for sprockets before placing their 1914 orders. We are prepared to furnish sprockets for replacements for all standard and commercial cars.

H. V. GREENWOOD, 122 So. Michigan Blvd., Chicago, Ill.; C. J. IVEN, Rochester, N. Y.; M. A. BRYTE, 788 Mission St., San Francisco, Cal.; C. D. SCHMIDT, 416 Broadway, New York City; F. SHIRLEY BOYD, 893 Boylston St., Boston, Mass.



Hotel La Salle

CHICAGO'S FINEST HOTEL

ERNEST J. STEVENS, Vice-Pres. and Mgr.

Located in the heart of the city, within easy reach of all railway terminals

RATES

ONE PERSON	Room with detached bath.....	$2 to $3 per day
	Room with private bath.....	$3 to $5 per day
TWO PERSONS	Room with detached bath.....	$3 to $5 per day
	Room with private bath.....	$5 to $8 per day

TWO CONNECTING ROOMS WITH BATH

Two persons	$5 to $ 8 per day
Four persons	$8 to $15 per day
SUITES	$10 to $35 per day

LA SALLE AT MADISON STREET, CHICAGO

Paint Your Car Yourself

Mohair top and leather dressings; repaint outfits, high gloss or dull; tire paint; hood and fender outfits; body polish, etc.

Save $25 to $75

IT'S EASY

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Our big free 42 page book, THE CAR BEAUTIFUL, tells how to paint your car yourself, how to care for a new car and tells of the very latest accessories for making the car beautiful.

$12.50 A pair of big 10½ in. Bullet **Electric Head Lights,** complete with 16 c. p. Mazda bulbs in black enamel and nickel. **$12.50**

We have a complete line of the latest 1914 lamps, electric, gas and oil.

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Patented October 7, 1913

Guaranteed 5,000 Miles
Absolutely Non-Skid

Non-competitive in quality, construction and service. Quality will not be sacrificed to reduce production costs. Our extra thickness of cushion tread is made of a high percentage of pure Upriver Fine Para Rubber and the finest grade of selected Sea Island Cotton. The remarkable dependability of the Overman Tire is strictly backed by our 5,000 mile guarantee. Retains non-skidding qualities throughout the life of tire

Fits any Standard Q D and Clincher Rim

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250 West 54th Street, New York

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(Copy Contributed)

By Elbert Hubbard

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Behind the project are over 100 firms and corporations who do big things. Over $5,000,000 are already pledged or in hand.

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It's a privilege to get in this glorious company and I wish that every reader would send a five spot or more today.

Enjoy the sweet satisfaction of knowing that you are in this glorious company who are making the world a fit place for gentlemen to live in.

Good roads are the most unselfish enterprise in the whole world of human betterments.

Send your contribution to

LINCOLN HIGHWAY ASSOCIATION
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Radiator Emblem, Membership Card and Certificate Sent on Receipt of Remittance.

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Closed Bodies for FORD MODEL T

LIGHT DURABLE WELL DESIGNED COMFORTABLE

IMMEDIATE DELIVERY

Write today for prices and specifications

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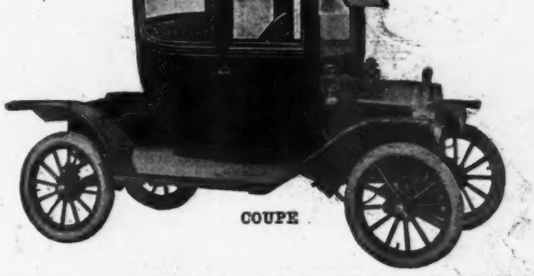

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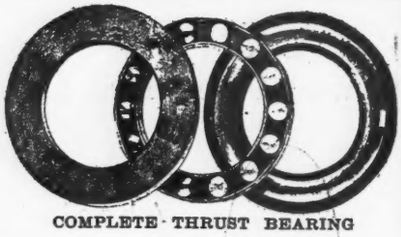

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The arrows on the cross section show how the load is evenly carried by upper as well as lower balls, making the only perfectly balanced radial bearing, and at the same time an ideal thrust bearing. This Double Row Ball Bearing will carry a greater load than any other ball bearing.

Races made from solid, special analysis steel. Specially selected alloy steel balls. Maximum size and greatest number of balls. Greatest bearing surface between race and balls. Closest limits of guaranteed accuracy.

Now used in motor cars, machinery, and to equip our Special Shaft Hangers. We also make plain and grooved thrust bearings.

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METZ "Twenty-Two" Roadster

THE GEARLESS CAR
"No clutch to slip — no gears to strip."

$475

1914 Improvements

Completely Equipped

Center control, left-hand drive, 4-cylinder 22½ H. P. water cooled motor, Bosch magneto, standard artillery wheels, best quality clincher tires, extension top, wind shield, five lamps, gas generator, tools, etc. Makes 5 to 50 miles per hour on the high speed, 28 to 32 miles on 1 gallon of gasoline, and is a wonderful hill climber. A strong, reliable, stylish, fully guaranteed car. You can secure EXCLUSIVE SALE in your territory. Write at once for Book "K" and particulars.

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GAS, OIL, AND ELECTRIC
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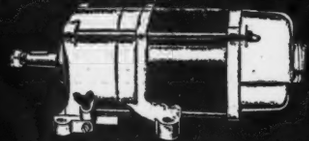
ELECTRIC STARTING & LIGHTING
ASSURES 100% EFFICIENCY



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Could see us build the Cable-Structur Tire—see how slowly and carefully our tire builders work — see what quality we put into Cable-Structur—see the letters we have from satisfied dealers and users, you wouldn't delay one minute in writing us for the exclusive agency in your city.

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have established the standard of electric car construction for all time to come.

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For 1914 and Be Satisfied
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Are unexcelled for long mileage and endurance.
Ask any user.

Send for price list and full particulars

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"Imperial Twelve" Garage Compressors

A high-class car equipment deserves high-class garage equipment. The quality of these little compressors is such as to appeal to the most discriminating buyers.

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Anyone can use this mold. Made in 4 sizes, for Nos. 2, 3, 4 & 5 hammers. Prices for mold and ladle, including 1 hammer handle: No. 2, 2-lb., $1.20; No. 3, 3-lb., $1.30; No. 4, 4-lb., $1.40; No. 5, 5-lb., $1.50. At all dealers or direct on receipt of price. Address Dept. F.

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We've looked them all over, tested them thoroughly; have reports from every known type. It was clearly "up to us" to land the winner and **here it is.** It's the best in **design, construction, workmanship, finish** and will make a **"Ford"** car run.

It has a magnet that's milled from a soli i piece of tool steel. It's not made of four pieces (as are some others), and which if jarred loose will leak current. The **"Gibson Quality"** cures that ill.

It has **genuine iridio platinum points.** Understand? We said **iridio platinum!!!** There's the troublesome part of every Master Vibrator but the **Gibson Quality.** This iridio platinum is known as the most efficient metal used in Electricity and where there are thousands of vibrations it is the only thing that will stand the wear. This iridio platinum is specially hardened over a new process which will resist wear for an indefinite period. **Gibson Quality Vibrators are positively guaranteed for every condition and service.**

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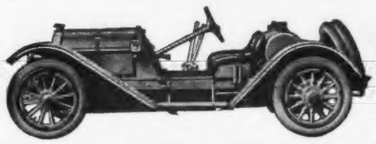

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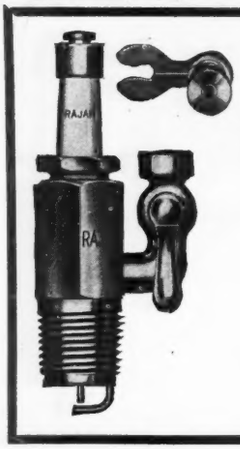

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Priming cup soldered in firmly to prevent leaking.

Material and workmanship of the highest grade—fully up to the standard set by us for over ten years.

Terminals as shown furnished with every Plug.

$1.50

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Write also for our new folder **"Packard Cable— How it is Made and Why it is Best,"** with liberal proposition to dealers.

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Screw Stock, Flats, Squares, Hexagons and Special Shapes

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All material finished to a superior degree of accuracy

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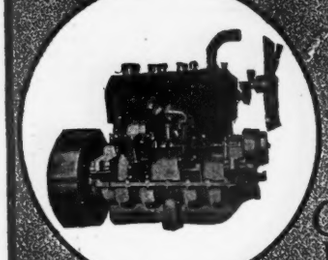

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4 AND 6 CYLINDER TYPES

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High and low tension magnetos, make-and-break coils, dash coils, box coils, motorcycle coils, switches, spark plugs and other ignition specialties. Guaranteed satisfaction.

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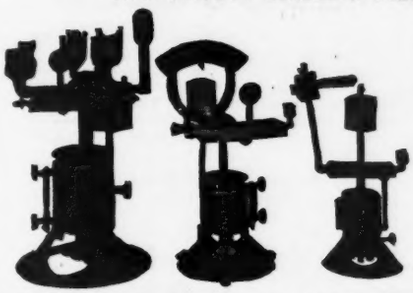
THE PROFIT MAKING PLANTS



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Plants from $25 to $500

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Write for details and let us tell you why so many manufacturers are adopting this carburetor as standard equipment

Made by the oldest manufacturers of carburetors in America

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In ordering Whitmore's Compositions, state definitely for what part of car lubricant is wanted.

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The performance of Eisemann Ignition Systems during the Indiana-Pacific Tour justifies every claim we have ever made for Eisemann efficiency and dependability.

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The Detroiter— $850 and $900 Completely Equipped

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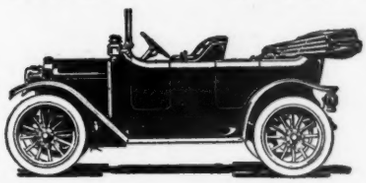

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Enclosed Valves, Three Point Suspension, Unit Power Plant, Platform Rear Springs, Full Floating Rear Axle, Left Hand Drive, Center Control, Drop Frame, Large Tires, Complete Ball Bearing Car

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Adapted to Overslung or Underslung Cyclecars

Adapted to Either Right or Left Steer, also Center.

Send your specifications and requirements for quotations. We can make immediate deliveries.

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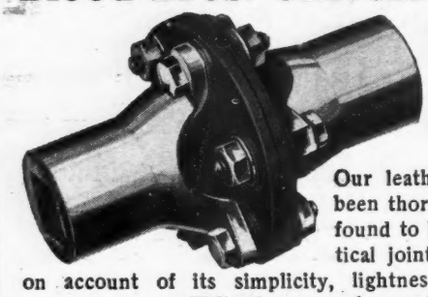

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Our leather disc type has been thoroughly tested and found to be the most practical joint for the cyclecar on account of its simplicity, lightness and low cost.

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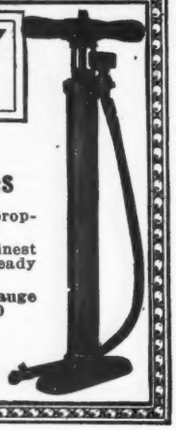

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The STAPLEY makes it easy to keep tires properly inflated.

It is an efficient Compound pump of the finest materials and workmanship; it is always ready and always works.

Price without Gauge $4.00 **With Gauge $6.00**

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Model "36" $1275.00

A car whose design and construction is so far ahead of others at its price that it is in a class all its own.

Gray and Davis Electric starting and lighting equipment, silent chain cam shaft drive, four inch by five inch motor, cork insert multiple disc clutch, 116 inch wheel base, left side drive, center control, and equipment complete to the last detail.

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This model has made the Paige reputation. Such a sturdy, powerful, comfortable car has never been offered the public at anywhere near its price. $975.00 with complete equipment.

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The Pilot "THE CAR AHEAD"

Three Great Models—Pilot 50—4 cylinder, 4½x6—59 H. P. —120 inch wheelbase, roadster and touring car—$2250. Pilot 50—roadster—4, 6 and 7 passenger bodies, 126 inch wheelbase—$2500. Pilot 60—6 cylinder, 4x6, brake test 67 H.P., 132 inch wheelbase, roadster, 4, 6 and 7 passenger touring cars—$2785.

THE CAR WITHOUT A MECHANICAL DEFECT

Teetor "T" Head Motors, full floating rear axles, Brown-Lipe differential, Warner transmission. Eisemann Magneto. Carter Carburetor, handsome jewel bodies with ventilating windshield. Completely equipped with every convenience and comfort. Dynamo electric lighting and electric starter (Gray & Davis system), power tire pump. We have the greatest agency proposition in the United States. Write for our beautiful art book showing cars in detail.

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You can take a thousand miles of service out of a set of tires by driving them insufficiently inflated over ten miles of road.

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Simple, Accurate, Durable and Easily Read

For sale by Jobbers, Dealers, Garages, or

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deSoto Cycle Cars $385

Contract Now to Be Sure of Spring Deliveries

The fastest, neatest two passenger tandem car to be had.

Speed, 40 miles per hour.

35 to 50 miles per gallon of gasoline.

Write today for particulars and specify exact territory wanted.

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that looks worn—or that you want to sell?

You can make it look new without inconvenience and with but slight expense. Paint it to-day—use it to-morrow. Go wherever Ford accessories are sold, or to our distributors in leading cities and get

The Original Ideal Package Retails for $6.50 Complete

It contains 15 articles—sufficient material to again make you proud of your car or to greatly increase its selling value.

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PRESSED Steel Frames for Pleasure Cars and Trucks

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Heavy Stampings—Forgings

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Worm-Bevel drive—the latest and greatest exclusively Borland Electric improvement — means an absolutely noiseless rear axle; greater power impetus; increased comfort; longer life for the car. Buyers already are boosting the demand for the Borland Electric.

Everyone wants to see this new Borland Electric worm-bevel gear.

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Use Polo Pneumatic Tire Alarms

Rim Cutting Entirely Done Away With —Lessens Blow-Outs and Blisters

Easily and quickly attached to valve stem, they take the place of the cap. Compactly made and reduced to the smallest possible size compatible with strength and durability. Running on low air pressure shortens the life of a tire more than any other cause. The Polo Pneumatic Alarm advises you instantly when the pressure falls below a given point, by giving vent to a shrill whistle.

Sold in sets of four, at $6.00 per set

We invite inquiries from dealers and auto users. Write for descriptive folder.

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The Only Genuine Streamline Motor Car Built In This Country

This epoch-making automobile with VULCAN ELECTRIC GEAR SHIFT, WESTINGHOUSE ELECTRIC STARTING and LIGHTING, BOSCH MAGNETO and WIRE WHEELS. Priced at only.....$2400

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"FOURS" and "SIXES".....$1775 to $2850

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In this new process, the steel is worked both longitudinally and transversely. So we get superior strength and toughness. We use this process exclusively in our Chrome-Vanadium Brand of Springs.

Find out more about them. It will make a tremendous difference in the riding qualities of your car.

Best Grade—Chrome-Vanadium
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In five years not one Cleveland - Canton Chrome - Vanadium spring returned because of breakage or settling.

Let us send you full particulars

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American Axles

Found only on high grade cars

THE AMERICAN BALL-BEARING CO.
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"32" Touring car, fully equipped	$1050
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"32" Touring car or Roadster with Westinghouse two-unit electric generator and starter; electric lights; over-size tires, 33x4 inches; demountable rims, extra tire carrier at rear	1200
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With same options as above	1300
Coupe $1350	Delivery Wagon $1075

All prices F. O. B. Detroit

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Backed by 15 years of specialization. Found on more high-grade cars than all other makes of lamps.

A Solar Lamp for every motor need.

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Six Cylinder, 65 H. P.
Equipped with Vulcan
Electric Gear Shift

Four Cylinder, 40 H. P.
Equipped with Vulcan
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America's First Car

Our advertising campaign will send a buyer into your showroom more than half convinced that he should own a Haynes; the sale, however, results only from a successful demonstration; it is our firm belief that as a Haynes dealer you possess more than a sufficient number of convincing arguments to make every demonstration result in a quick and profitable sale.

May we tell you why we believe this?

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When you buy SCHAFER BALL BEARINGS you are not experimenting because SCHAFER BALL BEARINGS have for years been recognized as the standard of bearing quality. They are made in Germany of the best steel and are now in universal use throughout the world

BARTHEL & DALY

42 BROADWAY **NEW YORK**

It Is a Great Deal Better to Use

TRADE MARK — REGISTERED IN — **NON-FLUID OIL** — UNITED STATES — EUROPE

because your car is NEW, than to have to do so because your car is prematurely OLD.

N. Y. & N. J. Lubricant Co., 165 Bdw'y., N. Y.

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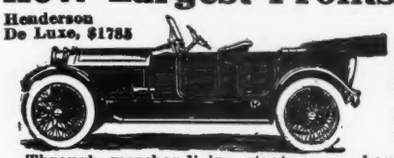
Henderson
De Luxe, $1785



We have some interesting facts in connection with increasing your car sales and *profits*.

Selling some cars, you may sell large numbers—and still your yearly business shows a *loss*.

Through merchandizing strategy we have remedied these flaws. May we tell you about these things and about our kerosene-burning car, equipped with wire wheels, cowl dash, cowl gasoline tank. Left drive, center seat control—the most salable car offered today.

Wire or write for the facts

Henderson Motor Car Co.

Indianapolis, Indiana

HENDERSON

Manufacturers of 1914 Models

Don't omit a SPARKS-WITHINGTON

Fan from your 1914 specifications. Our One-Piece blade, ball-bearing, radiator fan assemblies cool the motors of more high-class cars than any other fan on the market. There's a reason. SPARKS-WITHINGTON Fans deliver the greatest volume of air with the least H. P. consumption of any fan obtainable. Furthermore, their one-piece construction is positive insurance against blades which loosen, become detached and fly off. Undoubtedly one of our ten standard models is just what you have been looking for. Catalogue and detailed blue-prints on request. Get in touch with us.

The Sparks-Withington Co.

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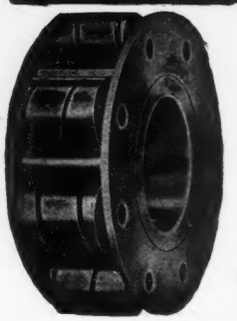

Lead the world in quantity of production. Twelve mammoth factory buildings required to supply the demand.

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HYATT ROLLER BEARING CO.

Detroit, Michigan

GUARANTEED FISK CASINGS, 36 x 4 Q. D. CLINCHER HEAVY CAR TYPE. WHILE THEY LAST AT $20.00 EACH.

The above casings have run less than twenty-five miles and carry the factory serial number and are fully guaranteed.

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Write for catalogue and prices.
We can save you money.
BUOB & SCHEU, Court & B'way, Cincinnati, O.

NEW CATALOG 300 PAGES Now Ready
MOTOR CAR
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WHOLESALE ONLY DEALERS, GET YOUR NAME IN
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AUTO-TOP FABRICS OF EVERY DESCRIPTION
SAMPLES AND PRICES ON REQUEST
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CAPACITY GURNEY ENDURANCE

Solid One-Piece Separator. Full Depth of Raceways to Resist Thrust, Uninterrupted Raceways. Full Complement of Balls.
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No Moving Parts
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THE FAMOUS Packard Auto Cylinder Oil
Will not carbonize. A perfect lubricant
GREENSLADE OIL CO.
Main Office: DETROIT, MICH.
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Spark Plug
50¢
50c. IS ENOUGH
The "Black Eagle" Spark Plug marks the dawn of a new era. From now on The Price of Spark Plugs will gravitate to Fifty Cents.
Why not be a pioneer in your territory?
The reason is apparent—none better at any price. Made in all standard threads mailed upon receipt of price.
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Write For Estimates
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For sale by Tire Mfrs., Jobbers and Dealers or
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INSURANCE FOR BUILDER AND USER
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Cars For Sale

A LATE DOUBLE "M" FORTY HORSE- power White Steamer, fine condition and fully equipped, including kerosene burner. Has not run three thousand miles. Will sell cheap. Address Box D 469, c|o Motor Age. w

ALL BARGAINS

New 30 H. P. Tour., Elec. L. & Starter	$950
New 30 H. P. Roadster, Elec. L. & Starter	900
New 30 H. P. Coupe, fully equipped	850
New 25 H. P. Tour., fully equipped	835
1913 25 H. P. Tour., Demonstrator	550
1913 25 H. P. Roadster, Demonstrator, Elec. L. & Starter	500
1914 35 H. P. Touring, Demonstrator	950

These cars are real bargains and guaranteed perfect condition. They must be sold at once to make room for 1914 models.

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AUTOMOBILISTS, ATTENTION!

When visiting the Chicago Show, do not overlook the opportunity of seeing the Used Car Department of the Locomobile Company of America. If you are not on the list of those who receive the Used Car Bulletin from this Department, write us today requesting that Used Car Bulletin No. 8—The Holiday Issue—be mailed to you at once.

USED CAR DEPARTMENT

The Locomobile Company of America

2000 Michigan Ave., Calumet 380

Chicago

FOR QUICK SALE. ONE HUDSON "54" 1913 Six Cylinder Touring Car. Perfect condition. Run 1,000 miles. Seat covers. Five Tires. Electric Lights and Starter. Car Cost, with Extra Equipment, $2,558. Will Sell for $1,800 Cash.

One New Hudson "34" Four-Cylinder Touring Car. Electric Lights and Starter. Sold for $1,875. Will Sell for $1,500 Cash. This Car Has Never Been Used.

A. R. Manley,
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FOR SALE—BRAND NEW STEARNS- Knight, six-cylinder, four-passenger car. Never taken off the floor; equipped with Silverton cord tires; painted gray with black stripes; special body design; cost $5,000.00, take $4,100, F. O. B., Kansas City, Missouri. Address No. 1010 Rialto Building, Kansas City, Mo. h

FOR SALE CHEAP—TRUCKS.

Owing to the location of our new general plant at SPEEDWAY, directly on switch tracks, we have on hand four or five second-hand trucks, two to three tons, not in good running order but just the thing for rebuilders and will sell as a lot at nearly junk prices. Here is your opportunity to get something to work on over winter that will bring in real returns. Write at once.

GENERAL TRAFFIC MANAGER,
THE PREST-O-LITE CO., INC.,
INDIANAPOLIS, IND.

FOR SALE—BRAND NEW 1912 STUDE- baker "20," nickel trimmed, fully equipped, new tires U. S., price $675.00. This model sold for $885.00. One Studebaker "20" 1912 brass trimmed, fully equipped, used 700 miles as demonstrator, price $565.00.

Milford Auto Co.,
Milford, Ill.

FOR SALE—MODEL Y STEVENS-DURYEA, rebuilt with new top, 1912 mud guards and foredoors. Run 13,800 miles; guaranteed like new, $2,000. The Auto Inn, Marion, Ohio.

FOR SALE—ONE 35 H. P., 4-CYLINDER, shaft-drive Pope. Double side chain drive, 4 first class tires, with roadster body and top, glass front, in first class running shape, good pull in machine or high powered roadster. Must sell, first check $160. Come and drive it away, or F. O. B. this city. W. E. Morrison, Lafayette, Ind.

FOR SALE—ONE 1912 INTERNATIONAL Harvester Delivery wagon, express body top and just overhauled; in first class running shape; ready to go. Solid tires. Price, $150. W. E. Morrison, Lafayette, Ind.

LOCOMOBILE, DOUBLE CHAIN DRIVE, make good truck, in good running condition, low price. Elmwood Garage, 450 Potter Ave., Providence, R. I.

Good Results

"Enclosed find check in payment for advertising in MOTOR AGE, two insertions. We have had good results from this ad and you will herewith find enclosed copy for six more insertions." A. H. Y.

MITCHELLS, REBUILT, GUARANTEED. These cars are fully equipped. Call or write for further particulars.

Mitchell Automobile Co.,
2334-36-38 Michigan Ave., Chicago.

NOW IS THE TIME TO MAKE BIG MONEY in livery work with a limousine. We have two Selden limousines both with extra touring bodies and tops and both in good running order. They can be bought for $700 each or will sell bodies separately. Write or wire before someone else gets them.

Mabbett-Bettys Motor Car Company,
252 Court Street, Rochester, N. Y.

OLDSMOBILE AUTOCRAT.

Late model sixty horsepower seven-passger touring car. A-1 condition, run only about 5,000 miles. Make offers; also other bargains.

427 East Sixth St.,
Waterloo, Iowa.

STEVENS-DURYEA, MODEL U, 5 PASS., 6 cylinder, 48 horsepower. Best of shape. Stoddard-Dayton, 5 pass. Ford, 5 pass. Studebaker, 5 pass. West Newton Garage Co., West Newton, Pa.

USED AUTOMOBILES, RUNABOUTS, roadsters, touring cars, 4 and 6 cylinders, all cars in good condition, prices low; terms liberal. Werner's, 1133 Main St., Buffalo, N.Y.

1912 EVERETT SIX CYLINDER 48 H. P. touring car. Fully equipped. 127 in. wheelbase, 36x4 tires. Excellent condition. Only run 5,000 miles. Cost $1,850. Sell $795. Cash. B. A. Carl, Jeromeville, Ohio.

1913 COLE SIX CYL. TOURING CAR

Run less than 600 miles, like new. Bargain for cash. Will trade for one or two light cars. Box D 584, c|o Motor Age. e

$750 BUYS 32 H. P. 1913 HUPMOBILE touring car, fully equipped (like new); a bargain, but be quick.

T. Sherow, Millbrook, N. Y.

Parts and Accessories FOR SALE

A $50.00 AIR COMPRESSOR, $18.00; FORD lighting outfits, $2.90; Ford radiator and hood covers, $2.75; Clamp on bumpers, $2.95; Ford master vibrators, $5.50, 6-80 storage batteries, $9.50.

FRED ALLEN AUTO SUPPLY CO.,
1610 Michigan Ave., Chicago, Ill.

A1 BARGAINS

30 H. P. Vertical tube radiators	$ 11.00
30 H. P. Steering gears complete (Gemmertype)	12.50
30 H. P. Axles front and rear shaft drive completely assembled and machined and with artillery wheels and demountable rims with springclips, nuts, spare rims, etc	82.50
38-42 H. P. 4¾x5 motor "L" head (Continental type) (Suitable for trucks, boats or pleasure cars).	250.00
Heat treated pressed steel frames with kick up	15.00
Special racing machine 90 M.P.H.	3500.00
G. J. G. 40 H. P. racing machine 70 M.P.H.	1250.00

Above are new, not used or 2nd hand

G. J. G. MOTOR CAR COMPANY.

White Plains, N. Y.

ACCESSORY CATALOG MAILED ON RE- quest. Dealers write for special prices anything wanted. When in New York come and see our January bargains.

WESTCHESTER ACCESSORIES CO.,
1777 Broadway, New York, N. Y.

ATTENTION—HENRY OWNERS

Having purchased the repair business of the Henry Motor Co., we are prepared to fill orders promptly for repairs for Henry cars.

Muskegon Automobile Co.,
Muskegon, Mich.

ATTENTION, WHITE STEAMER OWNERS! One Model "M" engine complete; one Model "O" engine complete; one Model "F" and "L" crankshaft complete; generators, burners, axles, wheels, springs and numerous other parts for any model cheap; also one fine straight line, seven-passenger body and one seven-passenger limousine body cheap; one good seven-passenger White Steamer with kerosene burner, $250; a snap. Address Box D 551, c|o Motor Age. w

AUCTION

MIDLAND AND MICHIGAN-40 STOCK

Four cylinder Midland, 4½x5¼" motor	$100.00
Planetary transmission, 10" diameter	15.00
Four cylinder Model Gas Engine Co. motor, 5x6, complete with magneto, carburetor, spark plugs, coil, pump, oiling device, fan, new	200.00
Electric starter driving chains....each	1.00
Electric Auto Lighter Co. auto lighter, complete	25.00
Jones speedometers with clock and odometer, nickel, complete with fittings	25.00
Jones speedometers, No. 40, with odometer, complete	12.00
Overland rubber mats	1.00
Lock washers, 3/16" to ¾" assorted .....per M	.80
Brass robe rails .....each	.30
Two cylinder opposed motor, complete with carburetor, coil, timer, oiler, new	35.00
10" flat front lenses, gas or electric ..... each	.20
10" bent lenses, gas or electric....each	.35
Vesta magneto generator complete with ampmeter	25.00
Michigan-40 double rear tire brackets .....per set	1.50
Shock absorbers .....per pair	6.00
Electric horns complete	2.00
Electric tail lights with bulb	1.25
One-ton truck steering gears	7.50
Detweiler steering gears, 18" corrugated wheel, 2" nickel plated post	15.00
E. Z. gas starter for Ford cars	5.00
18" mahogany laminated corrugated rims .....each	1.00
Ford gas headlights .....per pair	4.50
3-strand primary cable .....per ft.	.06
Starter cable .....per ft.	.12
Secondary cable .....per ft.	.03
Cyclecar planetary transmissions.each	10.00
Rubber beads for straight side tires ..... each	.25
Oakland windshields, nickel plated, complete with fittings	7.50
Mezger automatic windshields, brass or black, complete with fittings.each	6.50
Midland 7-pass. bodies, upholstered and painted	125.00
Midland, 5-pass. bodies, upholstered and painted	115.00
Michigan 5-pass. bodies, upholstered and painted	125.00
Michigan 5-pass. bodies in the white	25.00
Tops to fit most any car ..... Send in your sizes.	18.00
Auxiliary seats .....per pair	25.00
Rumble seats .....per pair	20.00
Midland mahogany dashes .....each	.50
Truck radiators, slightly used.....each	15.00
Solid rubber tires, 2x37.....each	5.00
Rushmore generators, brass .....each	2.00
6 cylinder Herschell-Spillman motors ..... each	275.00
Selective sliding gear transmissions ..... each	35.00
Midland multiple disc clutches..each	10.00
New Ohio motors complete with magneto, carburetor and coil.....each	100.00
Michigan-40 4 cylinder motors, complete with magneto, carburetor and coil .....each	100.00
Buda motors, complete with magneto, carburetor and coil	150.00
4 cylinder Cameron air-cooled motors ..... each	75.00
4 cylinder Mitchell motors, complete with magneto, coil, carburetor and oiler	145.00
Engine fly-wheels with starter gears attached .....each	5.00
Engine fly-wheel starter gears, 1" face ..... each	2.50
Valve stems, machined .....each	.25
16" mahogany corrugated steering wheels with aluminum spiders	1.50
Mosler spitfire spark plugs, battery type .....each	.40
Oil dash pumps .....each	1.00
Piston rings, all sizes.....each	.35
2¾" ball thrusts .....each	.50
2⅝" ball thrusts .....each	.35
2 1/16" ball thrusts .....each	.50
Goodrich safety tread tires, 34x4..each	21.00
Olds honeycomb radiators.....each	30.00
Owen honeycomb radiators.....each	30.00
Detroit demountable rim lugs.....each	.05
Detroit demountable rim lugs with nut .....each	.10
Firestone demountable rims, 34x4.each	2.00
Clincher beads, any size .....each	.75
34x4 demountable wheels ..per set of 4	8.00
Midland pressed steel frames, 5-pass..	5.00
Midland frames, 6 cylinder	10.00
Michigan-40 frames	5.00

AUTO PARTS CO.
737-739 Jackson Blvd.
Chicago

AUTOMOBILE ACCESSORIES

JANUARY SALE

Lowest Prices in the History of the Business

WINDSHIELDS—30 CENTS ON THE DOLLAR

Zig-zag or rain-vision, also clear vision. Single or double section—brass, black or nickel. These windshields are all brand new, of the highest grade of material and workmanship. We guarantee them to be exactly as represented or money cheerfully refunded.

TOPS

New Flanders "20" Touring Car tops; made of the best mohair, complete with irons, side and storm curtains; can be made to fit Flanders "20", Ford and Buick "10" touring cars; also other small four-passenger cars. Price $11.85.

GET OUR PRICES

We are the greatest money savers handling high grade accessories in the business. No matter what you need in accessories, get prices before you buy. We can save you from 25 to 100 per cent on anything in accessories.

ERWIN GREER & COMPANY

1456-64 Wabash Ave. Chicago, Ill.
Accessory Department.

AUTO TOPS BUILT AND REPAIRED. Seat covers and body building, remodeling and trimming. Write for prices.
BITELY TOP & BODY CO.,
404-410 S. Laflin St., Chicago, Ill.

Positions Filled

"I have filled the positions referred to, and have received numerous applications, so discontinue the ad. Rest assured that when we need additional salesmen, we will take pleasure in giving you the advertisement." E. H. C.

AUTO BODIES, WINDSHIELDS, WHEELS. 250 new panel top delivery bodies, some panel top, some open express with flare boards. Will fit three-fourths of autos made. $28 to $45. Folding plate glass windshields, $10 complete. New 32-inch wheels with solid rubber tires, only $12 each. Benedict Co., 63 Winder St., Detroit, Mich.

AUTO PARTS MAKERS
Repair and service parts for many cars. We own all patterns and parts in stock for Elmore, Warren, DeMott, Welch, Rainier, Marquette, De Luxe and other cars. Complete stock.
Puritan Machine Company,
Detroit, Mich.

AUTO RIMS AND RIM PARTS. DETROIT, Booth and Continental our specialty. Send for our rim part catalogue.
KASTNER TIRE AND RIM CO.,
2101 Michigan Ave.,
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BALL & ROLLER BEARINGS
All Types and sizes.
We also repair or exchange all makes of ball bearings.
THE GWILLIAM CO., 253 W. 58th St., N. Y.;
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BARGAINS—NEW RADIATORS

Buick, model 17	$30.00
Staver, various models	$30.00—35.00
Midland, T 4	32.50
Midland, T 6	35.00
Empire	25.00
Wayne 30	30.00
Cutting, various models	30.00

OTHER BARGAINS

Exide Storage Batteries, 6 volt, 40 amp.	$ 7.00
Prest-O-Lite Tanks, Model A	15.00
Prest-O-Lite Tanks, Model B	12.50
Prest-O-Lite Tanks, Motorcycle	6.00
Schebler Carburetors, 1¼", Model L	9.50
Auxiliary Seats, black leather with holding brackets, pair	22.00
Fenders, front and rear, pair	2.50
Warner Transmissions, 4 speeds and reverse	70.00
Trunks, 29½" long, 19½" wide, 14" high	9.50

Get List of Other Bargains

AUTOMOBILE APPLIANCE CO.

1714 Michigan Ave., Chicago, Ill.

BARGAINS—BARGAINS—BARGAINS

Is the only thing we handle, from a cotter pin to a complete car. Small and high-powered cars, engines, frames, bodies, axles, radiators, transmissions, magnetos, tops, etc. Before buying let us quote.

Pacific Motor Car Exchange Company,
10 West 62nd St., New York.

BERGDOLL REPAIR PARTS
The repair business of the Bergdoll cars, together with all drawings, jigs, patterns, etc., has been purchased by us. We have a complete stock of repair parts for all models on hand and orders for parts for Bergdoll cars should be placed with us direct to save time.
Louis J. Bergdoll Motor Co.,
124 N. 3rd St., Philadelphia.

CINO RACING MOTOR COMPLETE WITH double spark Remy racing magneto, $175.00; 25 H. P. Overland motor, $100.00; Apple lighting system, $30.00.
AUTO SALVAGE CO.,
1436 Wabash Ave., Chicago.

CUT-OUTS.
E.M.F., Flanders, Buick, Regal, etc. Complete outfit with brass lock open pedal, $1.50.
Lincoln Machine Shop, Lincoln, Ill.

DOES YOUR MOHAIR AND CANVAS TOP leak? Coleman's Waterproof Filler will make it rainproof. It will not stiffen or change the color. Virginia Waterproofing Corp., Arcade Bldg., Norfolk, Va.

DRAGON REPAIR PARTS
We manufacture and keep on hand all repair parts for the Dragon cars. We make a specialty of repairing this machine. Philadelphia Machine Works, 67 Laurel St., Philadelphia, Pa.

ELECTRIC LIGHTS FOR FORD CARS (self-contained system), including rectifier and battery. Also light controllers for use with headlight sets. American Battery Co., 1124 Fulton St., Chicago.

FORD OWNERS AND DEALERS!
You will save trouble and money by installing our timer elevating device.
Ford Parts Specialty Co.,
1211 Main St., Richmond, Ind.

FORD, HUPP AND MAXWELL
Muffler cut-out, machined ready to attach, including lock open pedal string and cables, $1.35. Lincoln Machine Shop, Lincoln, Ill. o

FORD DEALERS AND OWNERS.
The U. S. Auxiliary Oiler will with one filling lubricate your Ford motor properly and requires no attention for at least 500 miles. It is also equipped with a tell-tale dash gauge which indicates at all times the exact amount of oil in the Auxiliary Oiler. Write for full particulars. The U. S. Auto Parts Co., Inc., Kalamazoo, Mich.

FORD LIGHTING OUTFITS, $5.50
Includes parabolic reflectors, tungsten bulbs, wiring switch and free delivery.
Truscott Auto Supply Co., St. Joseph, Mich.

FORD-OWNERS

K. W. MASTER VIBRATORS

Reg. Price $15.00 OUR PRICE $12.50
Latest type with kick switch
Do you want our Catalogue?

THE M. & M. COMPANY
CLEVELAND'S LARGEST SUPPLY HOUSE
480-500 Prospect St., Cleveland, Ohio.

FORD OWNERS.
Atlas Valve Remover, specially designed for Ford Cars. Send $1.00, we ship Parcel Post. Atlas Machine Co., Providence, R. I. b

FORD OWNERS, OUR PURE WHITE FELT washers for Ford rear axles, stop grease leak. 20c set four, prepaid. Angier's, Streator, Ill.

FORD OWNERS, PROTECT YOUR CARS.

The Kimball Safety Noiseless Crankholder and Lock absolutely protects you from danger of broken crank pins, keeps the crank handle in upright position and is a positive theft preventive.

Made of spring steel, neatly enameled, it adds to the appearance of your car. It does away with the rattle caused from crank hanging loose or supported with strap.

Fitted with the Kimball Crankholder and Lock your car cannot be cranked until lock is removed.

Applied by anyone in five minutes, requiring no alterations in car. For sale at Ford agencies and garages, or sent prepaid, including lock, upon receipt of price, $1.50.

NORTHERN SPECIALTY CO.,
Crystal Falls, Mich.

FORD OWNERS—WE CAN MAKE YOUR car the easiest rider made with light or heavy load; no jolt, no jars, no upthrow. Write us. Thomas Auxiliary Spring Co., Canisteo, N. Y.

FORD OWNERS—OUR SPARE DEMOUNT- able wheel cures tire trouble on road. Doctors, attention. Write Angier's, Streator, Ill.

FORD T. OWNERS.
Foot throttle or accelerators, $1.50. Lincoln Machine Shop, Lincoln, Ill. c

FOR SALE.
Ford Taxicab Body. No. 1 condition.
E. B. Collins Motor Co.,
Danville, Ill.

FOR SALE CHEAP, ONE 60 H. P., 4-CYL- inder Imperial Motor, almost new, including transmission, $175.00. Leslie James, Richland Center, Wis.

FORE DOORS

We are prepared to make prompt shipment from stock and guarantee the doors to fit or money returned.
F. E. LORTZ CO.,
1547 So. Michigan Ave., Chicago, Ill.

FORE-DOORS AT CUT PRICES

Mr. Auto Owner and Dealer: If your car is without fore-doors, write today for bargain prices; to reduce stock.

DEPT. D, AUTO SPECIALTY MFG. CO.,

326-30 E. Market St.,
Indianapolis, Ind.

FOR SALE—A NEW 4 CYLINDER AUTO Engine, 4⅛ bore, 4½ stroke, cast in block, price $87. W. H. Murphy, Fox Lake, Wis.

FOR SALE — ONE SCHEMMEL OXY- acetylene plant; will sell at a big bargain.
W. H. Werbe,
Kokomo, Ind.

FOR SALE — 1911 MODEL LIMOUSINE Body for Pierce Arrow Model "48." In perfect condition; never been used but once and then for just one week. Can be had for $975.00; original cost $2,250.00. A Big Bargain.
Queen City Motor Co., Beaumont, Texas.

FOR SALE—3 BOWSER PORTABLE GAS- oline tanks, in good condition, for garage use. For details, write B. C. Hamilton & Co., 1218 S. Michigan Ave., Chicago, Ill.

FOR SALE—ONE $175.00 BOWSER GASO- line outfit. Brand new. Will sell at a bargain.
RANDALL MOTOR CAR CO.,
Fort Wayne, Ind.

GUARANTEED RADIATORS.

Not always necessary to buy new radiators. New cores can be furnished for frozen or damaged radiators. We build the fin and tube type. Guaranteed copper fins and tube.

Ford Model T core	$14.00
Ford R. S. & M.	23.00
Hupmobile 20	23.00
Hupmobile 32	30.00
Warren 30	25.00
Warren 40	30.00
E. M. F., Patterson, Cole 30	30.00
Flanders 20, Paige 1912	25.00
Buick 10, 14, 32 and 33	25.00
Buick 16, 17, 18, 19, 21, 26, 27	30.00
Hudson 20	25.00
Hudson 33, Cadillac 30	30.00
Paige 1910, 1911	23.00

The above is the price of cores only. Where casings are damaged beyond repair, add $5.00.

All our work guaranteed absolutely new—built to your order. Do not be misled, cores cannot be rebuilt. Write for price on radiators not mentioned in above list.

HURON RADIATOR & LAMP COMPANY,
253-255 Jefferson Avenue,
Detroit, Mich.

Terms: Cash with the order.

More Than Satisfied

"Please change our advertisement to read as per enclosed matter. Run until further notice. We have steadily secured excellent results from our ads in MOTOR AGE and are more than satisfied."

L. D. S.

GENUINE BARGAINS IN 25-30 H. P. FOUR cylinder automobile motors; also high grade stationary engines suitable for garages. We solicit all kinds of machine work and guarantee satisfaction.
ALFORD MOTOR & MACHINE CO.,
Goshen, Ind.

HAVE AN EXPERT BUY

and Inspect for You.
Machinery, Tools, Hardware and Garage Equipment.

Mechanical or Electrical

H. JONSON
OWNERS AGENT
207 Dyckman St.
New York

"JIFFY" SIDE CURTAINS FOR FORD cars. Everything complete ready to attach to bows. Touring $15; Roadster $12.50. Price-list curtains for all cars on request.
HERCULES RUBBER CO.,
"Jiffy Curtain Division,"
No. 2 Hudson St., New York.

LION REPAIR PARTS.
We have on hand a complete stock of repair parts for all models of Lion Cars.
Lion Motor Parts Co.,
124 N. 3rd St., Philadelphia, Pa.

MORA REPAIR PARTS
We purchased the repair business of the Mora Company and have in stock repair parts for all models of Mora cars.
Philadelphia Machine Works,
67 Laurel St., Philadelphia, Pa.

MAGNETOS: WE HAVE 2,000 MODEL X Splitdorf Magnetos, new. Price, without coil, $17.50 each; with coil, $25.00 each.
The regular price of these is $75.00.
We also have other makes of magnetos at cut prices—in fact, everything for the automobile. Send for "OUR PRICE WRECKER"—the greatest money saver in the world.
TIMES SQUARE AUTO CO.,
1210 Michigan Blvd., Chicago, Ill.
S. W. cor. 56th St. & Broadway, N. Y. City.

MAKE IT BY THE GALLON CHEAP.
Silver plating fluid for brass. Simply apply with soft cloth. Formula for dollar bill. W. H. Hegeman, Northwood, Iowa.

MICHIGAN CAR OWNERS
Having purchased all necessary parts to maintain the best service on Michigan cars, we are about to issue a reduced price list; all owners of Michigan cars will be benefited by sending application, giving name, address, model of car and date of purchase at once.
PHILADELPHIA MACHINE WORKS,
61 to 71 Laurel St.,
Philadelphia, Pa.

MR. FORD OWNER AND DEALER—THE (TOWNSAN VALVE ADJUSTER AND SILENCER) will quiet your motor, save you dollars on repairs. Sold by jobbers and dealers everywhere. If your dealer cannot supply you send $1.50 and we send prepaid.
Townsan Auto Spec. Co., Mitchell, S. D.

NEW FORD TOURING CAR BODY WITH top and side curtains, complete, painted and upholstered, crated, f. o. b. Toledo, $68.00. MacInnis Bros., Toledo, Ohio.

PEERLESS LEATHER TOP DRESSING.

A preserver for all rubber, leather and pantasote tops and curtains. Makes old tops like new. Ask your dealer.

THE COLUMBUS VARNISH CO.,
Columbus, O.

ON ACCOUNT OF MOVING WE WILL make special low prices on all magnetos and coils. Batteries re-charged. Pellet's Magneto Exchange, 1606 Michigan Ave., Chicago, Ill.

OXY-ACETYLENE WELDING AND CUT- ting Machine. The Admiral Welding Machine is built for service by men who know; large capacity; self-generating; portable; perfect for all classes of work. Send for booklet, "Welding and Cutting." Price, with Welding, Cutting and Carbon Removing Torches, all Filler Rods, Fluxes, Chemicals, etc., ready to begin earning big money, $250.
We do expert welding; prices right.
Admiral Welding Machine Co.,
1331 Walnut St., Kansas City, Mo.

PAINT YOUR CAR YOURSELF

Save $25 to $75 by doing the work at home with the Arsenal system. Our big free booklet, "The Car Beautiful," tells how. Send for it today.

ARSENAL VARNISH COMPANY
Auto Dept., Rock Island, Ill.

PEERLESS CUSHION DRESSING

Brightens and renews all leather seats and cushions. Will not wash or rub off. Dries in twenty minutes. Ask your dealer.

THE COLUMBUS VARNISH CO.,
Columbus, Ohio.

PRACTICAL VALVE GRINDER AND bearing scraper combined. Guaranteed to seat any valve in two minutes. A perfect bearing assured. With valuable working data by an automobile expert. Price 50c. Master Mechanic, Dept. B, Box 528, Oakland, Cal.

PEERLESS LAMP ENAMEL.

A black enameled lamp with one coat. Not affected by heat or cold. Does not crack, chip or peel. Made in either a gloss or dull finish. Ask your dealer.

THE COLUMBUS VARNISH CO.,
Columbus, Ohio.

RADIATOR COVERS FOR ALL CARS.
Every car should have a radiator cover in cold weather.
Write for prices.
Auto Cape Top Co.,
2334 Michigan Ave., Chicago, Ill.

PUT UP A GOOD FRONT

Detroit Radiators are built right, work right and stand up right. Every one guaranteed new and not to break through freezing.

A FEW STOCK RADIATORS

Ford T, special construction	$20.00
Ford T, honeycomb, larger cooling area	30.00
Ford T, V-Front	25.00
Ford N-R-S, less pump	20.00
Buick 10	26.00
Buick 16-17	31.00
Hudson 20	30.00

DETROIT RADIATOR & SPECIALTY CO.
963 Woodward Avenue
Detroit, Mich.

PEERLESS MOHAIR TOP DRESSING

Waterproofs leaking tops and makes old tops like new. Sold by garages, dealers and jobbers.

THE COLUMBUS VARNISH CO.,
Columbus, Ohio.

RADIATORS

Every radiator guaranteed absolutely new, not a reconstructed one.

In stock for immediate shipment.

Ford Model "T"	$18.00
Buick 10-14	27.50
Buick F-16-17-19-26-27-28	35.00
Hudson 20	33.00
Chalmers F-40	30.00
Hupp 32	25.00
E-M-F 30	30.00
Anhut	15.00
Northern C	32.00
Wayne 30	35.00
Special 40 H. P.	15.00

5% discount allowed for cash with order, otherwise one-third cash with order, balance C. O. D..

We also have all repairs for the Wayne, Queen and Northern cars.

AUTOPARTS MANUFACTURING COMPANY
453 Trombly Avenue, Detroit, Mich.

PEERLESS LINING DYE

Makes all faded, stained and spotted linings a black uniform color. Makes old linings like new. Ask your dealer.

THE COLUMBUS VARNISH CO.,
Columbus, Ohio.

RADIATOR COVERS
Full stock for all cars
Prompt shipment
Ford covers, $1.40; other cars, $2.50.
Send for my tire price list.
ALLEN S. SINSHEIMER
1505 Michigan Ave., Chicago

RADIATORS—NEW GUARANTEED GOODS

Ford, Model T	$16
Buick, Model 10	22
Buick, Model F	25
Chalmers-Detroit	20
Everett	20
Stoddard-Dayton	25

Any other make required at equally low prices.
The Times Square Automobile Co.,
1210-1212 Michigan Ave., Chicago.

"SAVE YOUR GASOLINE."
We have 150 Rayfield carburetors, regular $20.00 kind. Our price, $8.20 while they last.
PURITAN MACHINE CO.,
415 Lafayette Blvd., Detroit, Mich.

RADIATORS THAT COOL THE MOTOR and give satisfaction are W(RIGHT). Built for all cars. We have in stock—
Ford T. and all Buick models.

Michigan F-1911.	Velie 30-1909.
Oakland 24-1911.	Parry 1910.
Hudson 20-1910-11.	Hupmobile 1910-1911.

WRIGHT COOLER AND HOOD CO.,
8th St., Muskegon, Mich.

SCHEBLER MODEL "L" CARBURETORS, new, 1½-inch, $8.00 each. Order early. Kent Motor Car Co., Kenosha, Wis.

SEAT COVERS.

Owners of 1913 and 1914 Overland cars now buy high-grade covers for less than $15.00. Write at once for samples.

GLOBE SEAT COVER CO.,
Dept. M, Racine, Wis.

SHINAUTO—THE GREAT PRESERVER.

Keeps auto like new without washing. Prevents cracking and checking of varnish. Makes old cars like new. Guaranteed. Saves paint bills. Trial can, 50c by mail. Enough for two months' treatment.

SHINAUTO MFG. CO., INC.,
1137-1139 No. Illinois St., Indianapolis, Ind.

STOP THAT LEAK IN YOUR RADIATOR with one ounce of Overton's Radiator Leak Compound. A pound can by parcels post for 35c cash. N. L. Overton, 1109 4th Ave., Council Bluffs, Iowa. Prices to Dealers.

A Good Reason

"We do not care to repeat the advertisement in reference to the Knight car at this time. We sold it through the MOTOR AGE advertisement. That's why."
H. H. W.

THAT MYSTERIOUS RAG DUSTER.

For dusting and polishing automobile bodies, windshields, lamps, pianos or any other polished surface. House Size 25c. Automobile Size 50c. Sent to any address upon receipt of price. If not satisfied, return duster and we will refund purchase price.

THE GEM SUPPLY,
1036 So. Main St., Waterbury, Conn.

THE JONES & BUCKOKE

FUEL SAVING VAPORIZERS

Gives all year round service. No levers or complications; entirely automatic; operated by motor speed. A trial will convince. Positively effects appreciable economy. Folder on application. Jones & Buckoke, 1413 Mich. Ave., Chicago, Ill.

TOPS BUILT, RECOVERED AND REPAIRED. Also Top Covers, Radiator Covers, Luggage Cases, Celluloid, etc. C. G. Meyer & Son, Tiffin, Ohio.

TOPS, NEW OR RECOVERED; CUSHIONS and Backs, new or recovered; Carpet Rugs; Curtains; Dust Covers, etc. W. H. Newton & Son, 120 Elm St., Cortland, N. Y.

TRUFFAULT-HARTFORD SHOCK ABSORBERS; $45.00 kind; $20.00 set of four.
PURITAN MACHINE CO.,
417 Lafayette Blvd., Detroit, Mich.

TOURING ROADSTER, RACING BODIES. Seats, special and stock sizes. Radiators, hoods, tanks and fenders for any car. Get our prices.
Auto Sheet Metal Works,
1534 Michigan Ave., Chicago.

UNION OXY CARBIDE CO.
Manufacturers of Portable (weight 40 lbs.) and stationary welding, cutting or lighting plants; supplies of all kinds. Agents wanted. Fulton & Enfield Sts., Brooklyn, N. Y.

VULCANIZING
Easy learned. Book 50c.
VANDERPOOL'S, SPRINGFIELD, O.

"WE HAVE JUST TAKEN IN EXCHANGE 2-ton Saurer chassis in fine condition. 4 speed transmission direct on 3d. 4 cyl. long motor. Bosch high tension magneto.
Condon, 2635 Wabash Ave., Chicago.

WE MAKE FORD RACING TYPE BODIES in several models for immediate delivery.
Auto Sheet Metal Works,
1532 Michigan Ave., Chicago, Ill.

WE NOW HAVE BUT A FEW 30-35 AND 35-40 H. P. motors ready for shipment. Complete with magneto, coil and clutch. F. E. Alford, Goshen, Ind.

WESTON MOTT HIGH GRADE REAR axles, $45.00. Other bargains, too.
PURITAN MACHINE CO.,
413 Lafayette Blvd., Detroit, Mich.

WINDSHIELD SOLUTION KEEPS SHIELD transparent in rain. Snow and sleet slide off readily, maintaining good vision. A boon to night drivers. Instructions and formula 25c coin. V. A. Doty, Chicopee, Mass.

WINTER IS HERE

And there is no question but what FORE DOORS improve the appearance of any car as nothing else will, but when compared to the added comfort and pleasure which they give to both driver and passenger, appearance becomes a secondary condition. FORE DOORS installed on any make of car. Also write me about commercial bodies for the Ford car.
T. F. MURPHY
1546 Michigan Ave., Chicago, U. S. A.

YOUR MOTOR WILL START EASY IF YOU get the quality of gasoline you pay for. Our gasoline hydrometer proves this. Guaranteed postpaid complete with test jar $1.00. Hydrometer for testing amount of charge in storage battery, guaranteed accurate, postpaid $1.25.
Specialty Sales Co.,
3701 S. Grand Ave.,
St. Louis, Mo.

2-CYLINDER OPPOSED MOTOR, 14 H. P., set wheels, 34x3 inch, with tires; Olds rear axle; 1 Friction Trans., one set springs, half and ¾ scroll Krit radiator. Peter De Cloux, 110 Bryeau Ave., Oconto, Wis.

15 BRAND NEW TRUCK RADIATORS with hoods, $14.50 each. Have also lot of new ⅝" front and ¾" and 2" rear truck axles. Slightly used 34x3½" and 36x3½" truck wheels with solid tires; 18" diameter steering wheels with ratchet, levers, post, knuckles, etc.; 11½ ft. truck frame. Logan sliding gear transmission with jack shaft sprocket and chain for 1½ to 2 ton truck. Badger Motor Co., Milwaukee, Wis.

50 NEW PRESSED STEEL FRAMES, 163" long, 34" wide. Each, $10.00.
Send for sketch.
Lucas & Son, Bridgeport, Conn.

7-PASSENGER BODY, TOP, AND WIND-shield complete, new, for 1913 Chalmers "Six," $350.00; 7-passenger body for 1910 Winton "Six," good shape, $100.00; 1911 Cadillac 5-passenger, newly painted, fine shape, $675.00. M. H. Wood & Co., Webb City, Mo.

Wearing Apparel

FUR LINED OVERCOATS AT ONE-fourth value. Manufacturers' samples. Gentlemen's imported black broadcloth overcoats, lined with finest Australian mink, large handsome Persian lamb collar. All sizes. Retail value $120. While they last will be sacrificed for $35 each. First come first served. You take no risk. Examine and try on before paying. Write today, stating size, enclosing express charges only and coat will be sent at once. E. Roberts, Room 7, 160 West 119th St., New York.

Parts and Accessories
WANTED

TYPEWRITER—I HAVE A FINE NO. 7 Remington typewriter, a standard $100 machine that has been used but very little. I will exchange it for 3-Barrel Bowser Gasoline outfit, or a small screw cutting lathe. Will pay cash difference. W. H. Murphy, Fox Lake, Wis.

WANTED FOR MODEL K9 STODDARD-Dayton—Transmission case M3100, clutch, steering wheel and control, Bosch magneto D. U. 4, dash and two bucket or roadster seats.
Address Box D 586, c|o Motor Age. a

WANTED TO BUY—PREST-O-LITE AND other make gas tanks for cash. Walter R. Ebert, 959 34th St., Milwaukee, Wis.

WANTED—WHITE STEAM ENGINE, Model M. or M. M., in good condition; must be cheap for cash. A. M. Buncel, Bruneau, Idaho.

Cycle Car Accessories

CYCLECAR MOTOR DESIGNS.
Experienced motor designer has complete detail drawings and patterns for 2 cylinder 12 H. P. air-cooled motor designed for cyclecar use, also model. This motor can be contracted out and built for less than $30. Desire correspondence with interested parties. Anonymous replies rejected. Address Box D 568, c|o Motor Age. y

CYCLECAR
We will furnish designs and blue prints for either tandem or side-by-side seating, also all necessary parts to build same, blue prints and full information, $5.
We are prepared to furnish parts which have been thoroughly tested out on the road—no experiment. Front and rear axles, springs, steering gears, wheels and frictions.
Write for information.
Fenton Engineering Co., Fenton, Mich.

PARTS FOR CYCLE CAR OR LIGHT RUNABOUT
High Grade Pressed Steel Hubs
Steering Knuckles
Springs and transmissions

BRENNAN MOTOR MFG. CO.,
103 Grape St., Syracuse, N. Y.

Cars Wanted

AUTO WANTED

160 acres of nice level land, good soil, all fenced, no rocks or stumps, near neighbors, good crops, at $20.00 per acre. Will take a good car as part pay. State price and describe fully first letter. I am an old cuss but don't want an old cuss of a car.
A. L. STONE,
Texline, Tex.

CAR WANTED.
Will trade 40 acres irrigated land with fully paid water right. Investigation will prove a bargain at $75 per acre. Will consider second hand Pierce Arrow, Franklin, Cadillac or other high grade car in first class condition. Address
J. W. Craven, Twin Falls, Idaho.

FARM OF 60 ACRES TO TRADE FOR AUTO and get difference. Farm all improved. Soil black, sandy loam, ½ mile to railroad, fine location. Reason for selling, other business. If interested write A. Myers, Pullman, Mich.

FIFTY CARS WANTED FOR CASH.
Have customers waiting; if you want to sell your car quick, consign it to us; no charge whatever; we get our profits over your net figure; it is your privilege to remove car at any time without notice; will send for your car free within 200 miles.
American Used Motor Car Co.,
Brooklyn, N. Y.,
500 Bergen Street, Near Flatbush Ave.

FOR SALE—FOUR BUSINESS LOTS IN Balfour, N. D.; or will exchange for a good auto.
M. W. STUART,
Rt. No. 2, Bergen, N. D.

TO EXCHANGE, S. D. LAND FOR A GOOD auto. Give full description of auto and price in first letter.
Box 91, Edgeley, N. Dak. c

SEALED PROPOSALS, IN DUPLICATE, will be received in the Office of the Chief Clerk of the Department of Commerce, 19th Street and Pennsylvania Ave., N. W., Washington, D. C., until 2 p. m., Tuesday, January 20, 1914, and then publicly opened, for furnishing the Department of Commerce with one 1500-pound gasoline panel body truck. For full particulars, general instructions and specifications, address the Chief Clerk, Department of Commerce, Washington, D. C.

For Sale or Exchange

FOR SALE OR EXCHANGE FOR LIGHT six, will pay difference, 60 h. p., 7 pass., foredoor Stearns car, black and nickle finish, new mohair top, Presto tank, newly painted in Spring, car in A1 condition, great power, demountable rims. Address Box 334, Little Falls, N. Y. r

Situations Wanted

POSITION WANTED AS MANAGER OF garage or automobile business. I am now filling such a position with one of the largest garages in the Central West, of which I am part owner and am making this change solely on account of desire to change location. If you want your business increased and put on a good sound, paying business basis, your correspondence is respectfully solicited. Will be in position to change location about Jan. 1st, 1914. For further information address Box D 566, c|o Motor Age. a

WANTED—POSITION AS DRIVER FOR private family or tourist. Have had 8 years' experience, four years in shop and four on road. Can run and repair any make car. Good habits. Can furnish best of references. Address Box D-564, c|o Motor Age. h

YOUNG MAN, WHO HAS TRAVELLED through the South for years, selling autotires and supplies for Southern house, would like to represent big Northern concern. Can furnish A1 references. Address P. O. Box 304, New Orleans, La. m

Help Wanted

AUTO ACCESSORY SALESMAN WANTED to sell our guaranteed auto tire reliners, double locks, inner and outer shoes, etc. Liberal commissions and exclusive territory.
AMERICAN RUBBER PRODUCTS CO.,
24 So. Clinton St., Chicago, Ill.

SALESMEN WANTED TO HANDLE OUR line of plain and embossed gauntlets, exclusively or sideline. The best glove proposition on the market. Gloversville Gauntlet Co., Box 2-2-2, Gloversville, N. Y.

TRAVELING SALESMEN
Side line. I manufacture an article that sells to every repair shop and garage.
D. Ogden, Columbus, Ind.

WANTED—A THOROUGHLY PRACTICAL, hustling, Machine Shop Foreman, experienced on engine and pump work. A thorough mechanic, able to produce the maximum output on an A1 quality, at lowest cost. One that is familiar with the best and latest up-to-date practice. State age, experience, references and compensation expected. Address Box D 582, c|o Motor Age. w

WANTED—AN A No. 1 REPAIR MAN, ONE especially good on ignition and self-starters; small town northwest Iowa. Please state salary wanted and number years experience in first letter. Position open about March 1. C. P. Buswell, Meriden, Iowa.

WANTED—AUTOMOBILE SALESMAN, TO sell the Buick line in Kalamazoo, Mich, territory about Jan. 15, 1914. A good proposition to the right party who can actually sell cars.
Motor Vehicle Sales Co.,
135 Farmers Ave., Kalamazoo, Mich.

WE ARE CONSTANTLY IN TOUCH WITH Employers requiring High-Grade Engineering service. Are you listed with The Toledo Engineering Agency, Toledo, Ohio?

Wanted—Agents

WANTED — AGENTS TO SELL JIFFY Auto curtains in unallotted territory. Address
Hercules Rubber Co. (Jiffy Curtain Division),
2 Hudson St., New York.

YOU CAN GREATLY INCREASE YOUR income by representing our line of lighting systems; our
MATCH LIGHTING LAMPS
sell like wildfire both in town and rural districts. No experience required, profits large, exclusive territory to right parties. Don't delay writing for free catalogue and full information. Doud Lighting Co., 175-F No. Sangamon, Chicago.

Business Opportunities

A CYCLECAR MANUFACTURING COM-pany located in DETROIT, desires to get in touch with parties with capital to invest in same. The car far outclasses any other yet put on the market, both in appearance and mechanical features. It is already well known to the public and many orders are contracted for. This is an exceptional opportunity to get into an organization that has both experience and ability that insures it being a successful "stayer" in this new industry. Address Box D 581, c|o Motor Age.

AIR SPRING OR PNEUMATIC BUFFER
Patents for light and heavy cars are not offered for sale every day; however, I have two such patents, and would like to make terms with a manufacturer looking for something of this kind to place on the market.
M. P. Hayward,
Quincy, Mass.

AUTOMOBILE SPECIALTIES AND SUP-ply business having a large storage battery selling, recharging and repair department; having the exclusive sales agencies on three of the best selling staple accessories with a large territory. Established about six years. Location Western New York State. Reputation the best. A rare opportunity for a very profitable investment of $10,000, allowing for working capital. Address Box D 587, c|o Motor Age. m

CONSULTING AND DESIGNING ENGI-neer having new and practical designs for Cycle car and Motor wishes to meet responsible parties desiring to enter the Cycle car field. Mutual interest. Confidential. Address Box D 588, c|o Motor Age. w

CYCLE CAR DESIGNER, WITH SUCCESS-ful model, complete drawings and patterns including own design motor, desires to connect with parties able to furnish or command capital to build cyclecars. Promoters, agents or anonymous replies not answered. Address Box D 569, c|o Motor Age. y

FOR SALE—AN ALL MODERN GARAGE and Machine Shop in a city of 20,000 population. Ford Agency and largest storing capacity in city. Address Box D 590, c|o Motor Age.

FOR SALE: CLEAN STOCK OF AUTOMO-bile accessories in city of 20,000. Rent low. Only one other such stock in the city. 1,000 automobiles in the city and county. Stock is in first class condition and will sell it at a big bargain. Can pay part cash, balance on time. If you have from $500 to $1,000 and are a hustler here is your opportunity. Richest territory in middle west. Address Box D 583, c|o Motor Age. b

FOR SALE—MACHINE SHOP AND AUTO repairing in town of 25,000 in southern Ind. 3 lathes, 1 20-inch shaper, 2 drill presses, electric drills and grinders, attachments for cutting gears, Oxy acetylene welder, and all tools to make up a high class repair shop. Reason for selling, poor health. Address, Box D 589, c|o Motor Age. w

GARAGE BUSINESS, INCLUDING MA-chinery, tools and equipment. Thoroughly up-to-date building, low rental. Capacity 50 cars. $2,500 will purchase this business. Owner wishes to retire. Address P. O. Box 640, Albany, N. Y. k

INVENTIONS EXAMINED, PATENT AND Working Drawings made. Models developed and built. Free report as to patentability and cost for development of your invention. Address Inventions Dept. A, The Toledo Engineering Agency, Toledo, O.

MAKE MONEY SELLING EXTRA strength U-Kan-Plate silver plating polish. Splendid opportunity. Brassy automobile parts kept brilliant—white metal finish. "Just Use as a Polish." Best cleaner for nickel plate. Exclusive territory, liberal commissions. A. R. Justice Company, Manufacturers, 619 Chestnut St., Philadelphia.

THE TUBE LINK TIRE TREAD.

I want to get this invention on the market for the 1914 auto season. Who wants to take an active interest in its manufacture? I will sell the right to manufacture and sell, or will hire a number of them manufactured.

The Tube Link Tire Tread is made out of steel tube of different length and sizes. It takes from 20 to 30 links, or pieces, to each foot of casing. Each piece is from 6 to 10 in. long bent in a semi-circle. A slotted hole is in each end through which a wire or hoop runs. Each link works independent of the ones on either side of it, leaving them flexible but anything cannot go between the links to puncture. A ¼-in. gas pipe is suitable for casings over 3½-in. The tube being hollow will not heat or injure the casing. When the casing is inflated, after the tread is on, there is no chance for chafing, but every inch being flexible does not destroy the resiliency of the car, but does away with the costly rubber tread used on all tires.

Would like to explain further to interested parties who want or mean business.

W. R. REYNOLDS, PATENTEE,
Madison, S. D.

WILL SELL ALL OR HALF OF THE BEST equipped garage in the Middle West, located in the best city in Colorado. Have the agencies for the best line of cars on the market. Are well and permanently established and making money from a high-grade patronage. Personal reasons for selling not detrimental to business. Exceptional opportunity for parties in position to put up $30,000.00. Present owner would contract to work for buyer if satisfactory and wanted. Ideal place to live, climate fine, and nothing wrong in any way for proper party. Address Box D-560, c|o Motor Age.

Batteries

AMPVO STORAGE BATTERIES

FROM FACTORY TO CONSUMER
$7.50 to $16.00
Standard sizes; lowest prices; satisfaction assured by our strong factory guarantee. Catalog sent on request.

AMPVO BATTERY CO.
3031 Michigan Ave., Chicago, Ill.

Tires

AMERICAN AUTO TIRE RELINERS, INner and outer boots. All guaranteed products. Send for prices. Local dealers wanted.
AMERICAN RUBBER PRODUCTS CO.,
24 So. Clinton St., Chicago, Ill.

I WILL SELL YOU CLINCHER OR straight side tires, either firsts or seconds, cheaper than any one in the United States.
D. OGDEN,
Columbus, Ind.

NEW SOLID TIRES NEW
All S A E sizes

36 x 3	$10.00
32 x 3½	12.00
34 x 3½	14.00
36 x 3½	15.00
34 x 4	20.00
36 x 5	25.00
38 x 5	28.00
36 x 6	35.00
36 x 7	40.00
40 x 6	35.00

TIMES SQUARE AUTO CO.
1210 Michigan Ave., Chicago.

TIRE DROP! !
Lowest prices. Best quality tires. Every one guaranteed against defects. 30x3, $7.85; 30x3½, $9.85; 32x3½, $10.60; 33x4, $14.50; 34x4, $15.00. Non-skids 10 per cent additional. Special prices to dealers. Tires shipped C. O. D., subject to examination on deposit of 10 per cent.
TIRE SALES COMPANY
Buffalo, N. Y.

ONE FORD OWNER

in every town to act as agent for the extra heavy STODDARD TIRES made especially for Ford Cars.
You can save on your own tires and make a good profit in spare time.

Write at once to nearest branch.

STODDARD TIRE SALES CO.,
Worcester, Mass.
Chicago—608 So. Dearborn St.
New York—524-526 West 34th St.

ROCK BOTTOM PRICES
On Tires, Tubes and Reliners.
New and used. Write for prices.
ACME TIRE & REPAIR CO.,
1547 Michigan Ave., Chicago.
Phone Calumet 3127.

SPECIAL TIRE PRICES
On new Tires.
All fresh stock.
One thousand satisfied customers.

28x2¼	$ 4.00	33x4	$14.50
32x3½	11.00	34x4	15.00
34x3½	10.50	35x4	15.50
36x3½	11.50	36x4	16.00
31x4	13.50	36x4½	20.00
32x4	14.00	37x5	25.00

All other sizes in proportion.
Bargains in slightly used repaired tires. Shipped with 10 per cent on order, balance C. O. D., subject to examination.
SERLIN TIRE CO.,
1073 14th Place, Chicago, Ill.

Rebuilding and Repairing

ANDRE G. CATELAIN
General Machine Work
For Foreign and American Cars
Welding all kinds of metal
EVERREADY AUTOMATIC ENGINE STARTER SALES SERVICE.
Manufacturer Catelain Hose Coupling.
1446-8 Indiana Ave. Tel. Calumet 1187
Chicago.

AUTOMOBILE CYLINDERS REGROUND, new piston and rings fitted. Garage Air Compressors. Cast Iron Brazing Co., Manchester, N. H.

AUTO SPRINGS REPAIR CO.
We manufacture and repair springs. Proper action compound put in springs. 1331 Jackson Blvd., Chicago, Ill.

C. A. NEWTON'S FORD REPAIR SHOP—
Exclusive Ford Repairs.
1505 So. Michigan Ave., Chicago, Ill.
Phone Cal. 5246.

CYLINDERS REGROUND
and fitted with new pistons and rings for $15 per cylinder. We make parts and cut gears of all kinds. Send us your old parts and we will repair or duplicate them in record time. Cracked cylinders, gear cases, etc., welded and made good as new. Aluminum, bronze and brass castings of every description.
THE ADAPT MACHINERY CO.,
1624 Wabash Ave., Chicago, Ill.

CYLINDERS REGROUND AND FITTED with new pistons and rings for $7 to $11 per cylinder. We do this class of work exclusively and are thus able to give you the highest class of work at these prices. The Crown Machine Shop, Crown Point, Ind.

CYLINDERS REGROUND
And fitted with new pistons and rings. EXPERT REPAIRING AND REBUILDING. Old parts satisfactorily repaired or duplicated. Cracked cylinders, gear cases, etc., perfectly welded and machined. Aluminum, bronze and brass castings of any design.
Hansen-Busch Auto Co.,
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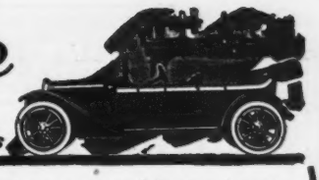

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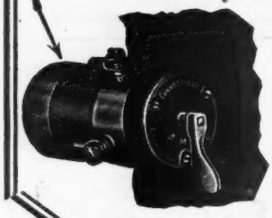

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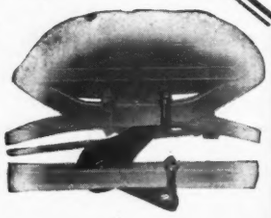

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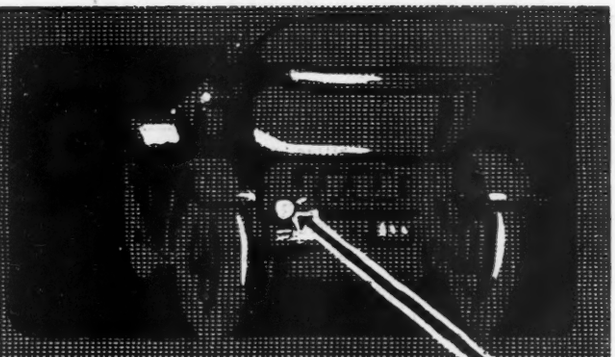

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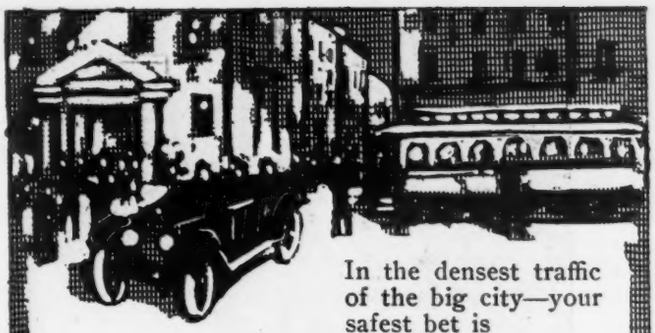

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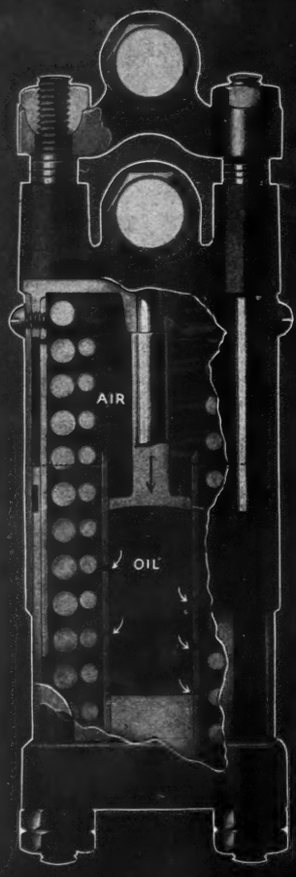


The Small, Compact, Efficient, Hydraulic - Pneumatic Spring

Shock Absorber

"Made like a gun."

"Rides like a motor boat."

At last a hydraulic-pneumatic spring shock absorber that is only 7½ inches high and produces the maximum of car economy and comfort.

$35 per pair and up.

For both pleasure cars and commercial vehicles. A combination of the best features of hydraulic and spring shock absorbers, together with the most advanced improvements.

Made for both front and rear.

Made in France and sold with remarkable success throughout Europe.

We are appointing an agent in each city and town throughout the country.

Write or wire without delay.

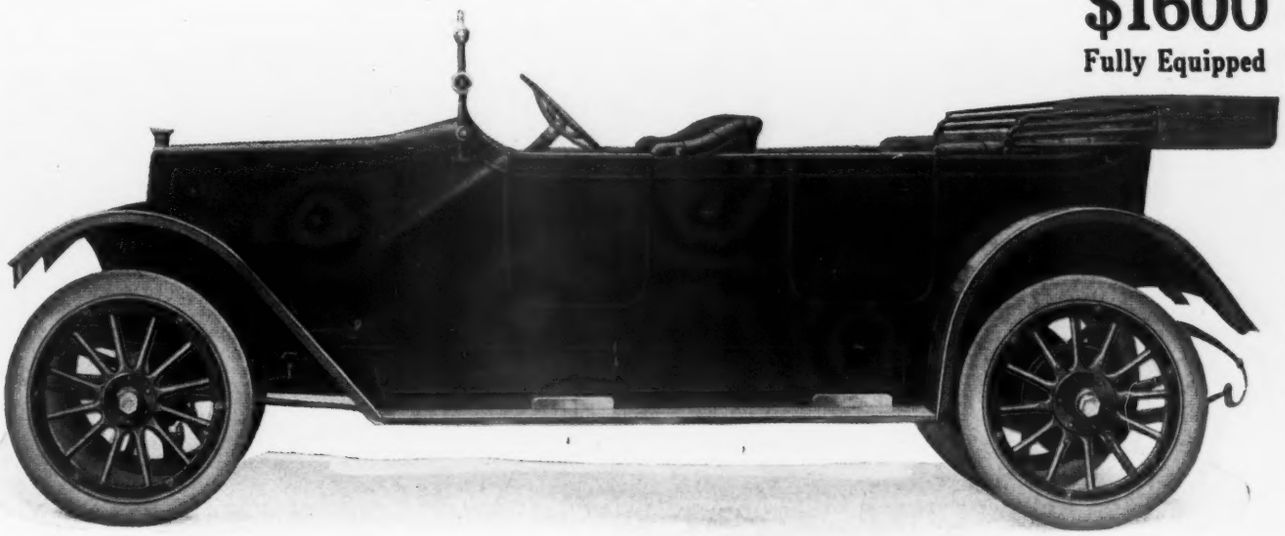
HUDSON EXPORT & IMPORT CO.

140 WEST 42nd STREET, NEW YORK.

Enclosed in neat leather case

DISTRIBUTING AGENCIES: Boston, John V. Wilson Co.; Chicago, Rhineland Machine Wks. Co., 1254 Michigan Ave.; San Francisco, Alfred H. Coates, 444 Market St.

$1600
Fully Equipped



Announcement of the

Wonderful New Lewis Six
—THE BIGGEST NEWS IN JANUARY "MOTOR AGE"

Now Comes the Ultimate Car. In Inner Circles of Automobile Industry the Coming of a Car of as Astounding Value as This Has Been Expected for Not less than Five Years. For Now We Have Duplicated in Everything Today's $5000 Type of Automobile. And in Addition, the Lewis Six Has Certain Economies and Luxuries Not Offered by $5000 Makers.

Hitherto, the Public, by Paying Big Prices for Less, Forbade Such a Car.

THE new Lewis Six is the masterpiece of a famous French engineer. His experience embraces leading motor car factories of four great automobile building nations—France, England, Italy and America. He was formerly with such cars as Fiat, Italia, Darracqu, Unic.

So the new Lewis is the first American car designed by a European engineer, the first car to embody the original advancements that put Europe two years ahead of this country in motor car design.

World's Greatest Motor Car Value

Judge by these points the unprecedented value we offer:

A 6-Cylinder Car
135 Inch Wheel Base
Light Weight, 3,250 Pounds
Pure Stream Line 6-Passenger Body
Entz Self-Cranking System
Electric Lighted
Left Drive; Center Control
Monobloc Motor, 3½ x 6
Underhung Rear Springs
Big Tires, 36 x 4
$1,600, Fully Equipped

If you have noted the points above carefully you are startled into realization of the truth that here is the World's Greatest Motor Car Value.

The Master Stroke in Utter Simplicity

The design of the Lewis is absolutely new. It is not a design that has come down through the years of the automobile industry to be patched over each year to encompass some new feature.

It was designed for the self-cranking system; designed to be electric lighted; designed for a 6-passenger stream line body and every other advanced feature.

Consider its simplicity—**the Lewis Six has approximately 1,000 fewer parts than any other motor car in its class!**

Astonishing Economy

Any man can now drive a six-cylinder car as cheaply as he can drive a "four." In the hands of ordinary drivers we would be willing to guarantee 13 to 16 miles to the gallon of gasoline over almost any road conditions for the Lewis Six.

Our engineering tests produced 19⅗ miles to the gallon.

Your Copy of the New Catalog Is Waiting

The complete description of this wonderful, beautiful new car is contained in the catalog, just off the press. Your copy awaits word from you. Write today to the

L. P. C. MOTOR COMPANY, 101 Lewis St., Racine, Wis.

WILLIAM MITCHELL LEWIS, President **RENE M. PETARD, Vice Pres., Designer** **J. M. CRAM, Sec., Sales Manager**

To the Best Motor Car Dealers and Distributors in the United States

THE keen motor car merchant sees in this wonderful car business possibilities equally amazing. We are holding most territorial contracts in abeyance, pending the appearance of this announcement. We have an offer for you that is an advancement over ordinary factory contracts, from your viewpoint. Let us hear from you in today's mail.

J. M. CRAM, Secretary-General Sales Manager

At the Automobile Shows—

Ask Each Maker These Questions:

"DO you furnish *a* Starting and Lighting Equipment —or WESTINGHOUSE ELECTRIC?"

"Does your car carry *a* Magneto — or the BOSCH?"

"What are your tires? The common quality—or GOODYEAR NO-RIM-CUT?"

"How about the carburetor—*a* Carburetor, or the RAYFIELD? Both air and water heated."

"Do you supply *a speedometer*—or the WARNER AUTO-METER?"

"Do you furnish *an extra rim* or extra tire on rim with two extra inner tubes and tire cover?"

"In short, what do you include when you speak of equipment?"

"Am I to judge the Hidden Values—those things I can't see—by what I *can* see?"

Here are the Specifications of 1914 Case Cars.

Clip them out, keep them for comparison. They're interesting.

Then, at the Show, see if any other Maker offers Equipment of equal Quality and Completeness.

All these parts are the best in their line. They cost us extra money. The manufacturer who furnishes less is saving a lot of money at the buyer's expense. Think this over carefully when you buy a car.

Learn, too, of the maker's experience. Assure yourself that he is big enough and successful enough to stay in the business. For some day, no matter what car you choose, you'll need Service—and an occasional Repair Part. Some day, when you go to sell your car, you'll want a *high resale* price. You'll get none of those advantages if the Maker has quit.

The Case Complete Car is produced by a 72-year-old concern, capitalized at 40 million dollars. A concern as anxious to give value as you are to get it. We save where other manufacturers must spend. Thus we spend when they must save.

If you can't visit the Automobile Shows get the catalog describing Case Complete Cars.

We shall appreciate your inquiry for our book.

The CASE "40"

Westinghouse Electric Starting and Lighting Equipment.
Bosch Magneto (2-Point, Dual System).
Warner Auto-Meter.
8-Day Clock—Rim Wind.
2-Tone Electric Vibrator Horn.
Firestone Universal Quick-Detachable Demountable Rims.
Goodyear No-Rim-Cut Tires (37x4½).
Extra Tire on Extra Rim.
Two Extra Inner Tubes.
Tire Cover.
Weed Tire Chains.
Timken Full-Floating Rear Axle.
Timken Front Axle.
Rayfield Carburetor, heated by both air and water, with Dash Adjustment.
Mayo Impulse Tire Pump.
Genuine Pantasote Top, Side Curtains and Dust Hood. Curtains folded in top, quickly adjusted from seats.
Rain Vision Ventilating Windshield.
Electric Head Lights and Tail Light with Combination Oil and Electric Side Lights.
Electric Dash Lamp.
Work Light on Long Wire.
Robe Rail, Foot Rest and the usual tools, Tire Repair Kit, Jack, etc.
T-Head Motor (4½x5¼).
Forty Horsepower.
Wheel Base 124 inches.
Price, $2,300 (including all the above equipment).

The CASE "35"

Westinghouse Electric Starting and Lighting Equipment.
Bosch Magneto (Dual System).
Warner Auto-Meter.
8-Day Clock—Rim Wind.
Electric Vibrator Horn.
Firestone Universal Quick-Detachable Demountable Rims.
Goodyear No-Rim-Cut Tires (35x4½).
Extra Tire on Extra Rim.
Two Extra Inner Tubes.
Tire Cover.
Weed Tire Chains.
Rayfield Carburetor, heated by both air and water, with Dash Pot and Dash Adjustment.
Mohair Top, Side Curtains and Dust Hood. Curtains folded in top, quickly adjusted from seats.
Rain Vision Ventilating Windshield.
All Lamps Electric.
Work Light on Long Wire.
Left Hand Drive, Center Control.
Robe Rail, Foot Rest, and the usual tools, Tire Repair Kit, Jack, etc.
T-Head Motor (4¼x5½).
Thirty-Five Horsepower.
Wheel Base 120 inches.
Electric Dash Lamp.
Price, $1,850 (including all the above equipment).

The CASE "25"

Westinghouse Electric Starting and Lighting Equipment.
Bosch Magneto—Duplex System.
Warner Auto-Meter.
8-Day Clock.
Electric Vibrator Horn.
Baker, 6-Bolt Demountable Rims.
Goodyear No-Rim-Cut Tires (32x4).
Extra Tire on Extra Rim.
Two Extra Inner Tubes.
Tire Cover.
Weed Tire Chains.
Rayfield Carburetor, heated by both air and water, with Dash Pot and Dash Adjustment.
Mohair Top, Side Curtains and Dust Hood. Curtains folded in top, quickly adjusted from seats.
Rain Vision Ventilating Windshield.
All Lamps Electric.
Left Hand Drive, Center Control.
Work Light on Long Wire.
Robe Rail and the usual tools, Tire Repair Kit, Jack, etc.
T-Head Motor (3¾x4¾).
Twenty-Five Horsepower.
Wheel Base 110 inches.
Electric Dash Lamp.
Price, $1,250 (including all the above equipment).

J. I. CASE T. M. COMPANY, Inc., 505 Liberty Street, Racine, Wisconsin

Case Cars are sold through 79 Branch Houses and 9,000 Dealers in the United States, Canada, South America and Europe.

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The Car With the Famous Engine

The Sign of Mechanical Excellence the World Over